AUTOMOTIVEINDUSTRIES

A CHILTON PUBLICATION

SEPTEMBER 1, 1959

MACHINE TOOL

PRODUCTION EQUIPMENT EDITION

EQUIPMENT SECTIONS

Machine Tool Forming Processing Handling Quality Control Welding Specialized

productivity



Ludlow King Urges Expanded Cooperation and Exchange of Ideas on Industry Problems

PAGE 55



Automotive and Aviation Manufacturing
ENGINEERING • PRODUCTION • MANAGEMENT

This Standard Oil product made better grinding possible at Cessna

Aircraft Company's Industrial Products Division licked three problems with ARGON Oil No. 4

Situation: A fluid used in grinding operations at this Cessna plant at Hutchinson, Kansas, was creating three problems:

- 1) It washed the lubricant from regulator wheels and grinding fixtures, causing them to freeze.
- 2) It caused build-up of deposits.
- 3) It stripped paint from machine surfaces.

What was done: Cessna management called in a Standard Oil lubrication specialist who recommended Argon Oil No. 4 in ratios of 100 and 150:1 for test. The coolant was tested in two centerless grinders for two months.

What happened: All three conditions which were hampering operations were cleared up when the switch was made to Argon Oil No. 4. Cessna also found that work remained rustfree after passing through the machines, something that had not been the case before. They also found that the coolant didn't foam. With no foam, more of it stayed on the wheel, resulting in cooler operation. Faster cuts were obtained with finer wheels. All 12 grinders in the Cessna shop were then converted to Argon Oil No. 4.

What you can do: Get more facts about Argon Oil No. 4 from the Standard Oil office near you in any of the 15 Midwest or Rocky Mountain states. Or write Standard Oil Company (Indiana), 910 South Michigan Avenue, Chicago 80, Illinois.

work and machines . All chemical. Does not support bacteria

and you get it!



How to make big diesel drives dependable...and PAY OFF



with COTTA HEAVY-DUTY REDUCTION UNITS

In designing hard-working, dieselized equipment that has to operate thousands of miles from the nearest repair parts facility, it will pay you to specify Cotta heavy-duty reduction units.

On the main pump of this dredge (shown working on the Caribbean shoreline), the builder used a Cotta 1.68:1 reduction unit behind a supercharged Caterpillar 4 cycle model D353 diesel engine. The pump has been in continuous operation since its completion in Miami several months ago, working at rates up to 150 yards of rock and sand per hour-more yardage per horsepower than from two other dredges used on this same project. The engine horsepower of 290 is easily delivered to the pump through the tough, smooth-operating Cotta reduction gear.

the going is rough and last the lifetime of the engine. Thousands of dependable Cotta units are in use all over the world on rail cars, cranes, winches, drilling rigs, trucks, and other heavyduty mobile equipment.

Whether you have a problem of transmitting

2,000 ft-lb of torque behind a big, high-speed

engine, or providing multiple speeds at medium

torque loads, Cotta can build you an "engineered-

to-order" transmission or gear reducer, in quantities of one or 100, that will do the job when

THIS INFORMATION WILL HELP YOU

Sent free on request - diagrams, capacity tables, dimensions, and complete specifications. State your problem - COTTA engineers will help you select the right unit for best performance. Write today.

COTTA TRANSMISSION CO., ROCKFORD, ILLINOIS



REDUCTION UNITS

"Engineered-to-order"



Acids, Beverages, Caustics, Dyes... everything goes in Stainless Steel tankers

Cleanability of corrosion-resisting type 316 Stainless Steel gives tank trailers great hauling flexibility

Leave the home lot in the morning loaded with animal or vegetable oils, return in the evening with paint or varnish, and back on the road before daylight with a load of glue...

This is the kind of flexibility you can build into a tank trailer when you use type 316 Stainless Steel.

Its lasting resistance to corrosion means that many liquids—chemicals, foods, petroleum products — can be bulk transported in the same tanker. Usually, all that's needed to change

from one product to another is a quick, but thorough, cleaning job.

The corrosion-resisting quality of type 316 Stainless also boosts the service life of the tanker. One motor transport company reports that they bought their first stainless steel tanker 20 years ago and it's still in service.

Easy to fabricate...
economical to produce

The nickel content of 316 Stainless

Steel not only enhances the metal's corrosion resistance and durability, but also gives it unusual ductility and weldability . . . makes possible fast, simple fabrication . . . economical production.

If you would like more information about the superior corrosion resistance and fabricability of 316 Stainless Steel... as well as the specific properties and characteristics, just let us know. We'll answer any specific questions you have.

The INTERNATIONAL NICKEL COMPANY, Inc. 67 Wall Street Inc. New York 5, N. Y.

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NICKEL MAKES ALLOYS PERFORM BETTER LONGER

AUTOMOTIVE

A CHILTON MAGAZINE . PUBLISHED SEMI-MONTHLY

SEPTEMBER 1, 1959

VOL. 121 No. 5

MACHINE TOOL AND PRODUCTION EQUIPMENT EDITION

FEATURES

Program for Production U.S.A.-By Ludlow King

NMTBA's Executive Vice-President reviews typical advancements in productivity achieved by inter-industry cooperation—and points out where close collaboration between the automotive, aircraft, and machine tool industries can meet the challenges of specific present, as well as future, problems of mutual concern.

Page 55

Machine Tools and Production Equipment

Published annually as a special service to AI readers, this issue contains a "guide-book" in which is presented a comprehensive array of the latest in plant and production equipment applicable to automotive component and parts production. The 210 items described are listed in seven major sections, as indicated below, for convenient reference when planning and selecting new facilities.

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Boring, Broaching, Deburring, Drilling, Grinding, Honing, Milling, Profiling, Tapping, Transferring, Turning

FORMING EQUIPMENTPAGE 79

Bending, Stamping, Rolling, Forging, Shearing

PROCESSING EQUIPMENTPAGE 87

Coating, Heat Treating, Painting, Plating, Cleaning

AUTOMATION AND MATERIAL HANDLING EQUIPMENTPAGE 96

Industrial Trucks, Transfer Units, Controls, Feeding Devices, Loaders, Unloaders, Conveyors, Separators

QUALITY CONTROL EQUIPMENT....PAGE 101

Balancers, Gages, Comparators, Hardness Testers, Electronic Inspection, Measuring Devices

WELDING EQUIPMENTPAGE 108

Resistance, Shielded Arc, Shielded Gas, Seam and Spot, Wire and Rods

SPECIALIZED EQUIPMENTPAGE 112

Components, Attachments, Drives, Riveting, Marking, Portable Tools

OTHER FEATURES

Industry News, Metals Report, Observations, Industry Statistics, News of the Machinery Industries, and Automation News Report.

. . . continued on next page

MEMBER



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weather study Award

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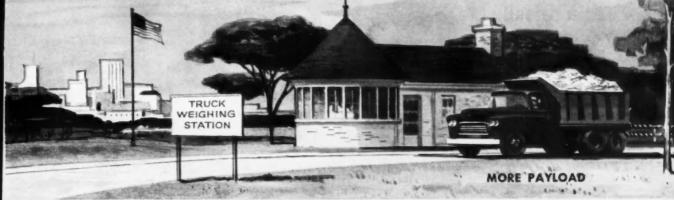
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REASONS WHY VACUUM POWER BRAKING IS FIRST CHOICE ON TRUCKS







WITH BENDIX HYDROVAC* LEADING ALL OTHER MAKES COMBINED

When it comes to power braking, the overwhelming choice on trucks is vacuum power, with Hydrovac leading all other makes combined.

You can bet your bottom dollar that such overwhelming preference is based on solid reasons. For example:

By saving dead weight, vacuum power can add several hundred pounds to *payload*, and earn extra dollars, as tonmiles build up. In addition, there is the vital safety stand-by of instantly available physical braking, instead of "no power, no brakes!"

Then, with vacuum power there is less first cost and less expense for maintenance, and it is completely free of compressor drain on engine power.

Any way you look at it, it will pay you to make Hydrovac Vacuum Power Brakes your choice for the best in power braking . . . for the most in value.

Bendix PRODUCTS South Bend, IND.



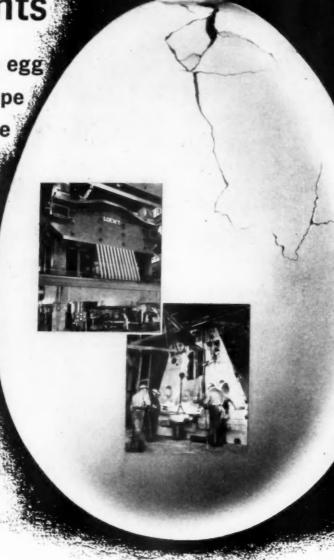
Hands of the Giants

or shape a missile

of pressure—so delicately controlled that it can be made to crack the shell of an egg.

Use the fabulous forces of present day forging skills to crack the barriers of space—weight, strength, shigh temperatures.

Forge the future, today.



WYMAN-GORDON

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ALUMINUM MAGNESIUM

TEEL TITANIUM BERYLLIUM

MOLYBDENUM C

COLUMBIUM

AND OTHER UNCOMMON MATERIALS

WORCESTER, MASSACHUSETTS

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DETROIT, MICHIGAN

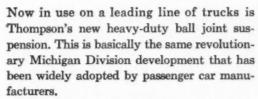
GRAFTON. MASSACHUSETTS

FORT WORTH, TEXAS

FRANKLIN PARK, ILLINOIS LOS ANGELES, CALIFORNIA

Automotive Industries, September 1, 1959

BALL JOINT
SUSPENSIONS
HELP MAKE
TRUCK STEERING
ACCURATE
AND EASIER



Thompson ball joints on trucks make steering accurate, precise and easier. Maintenance costs are reduced.

Here is another example of the progress that Thompson's Michigan Division has made in helping the automotive industry build better, customer-pleasing vehicles at lower costs. For complete details, call JEfferson 9-5500, or write us at 34201 Van Dyke, Warren, Mich.





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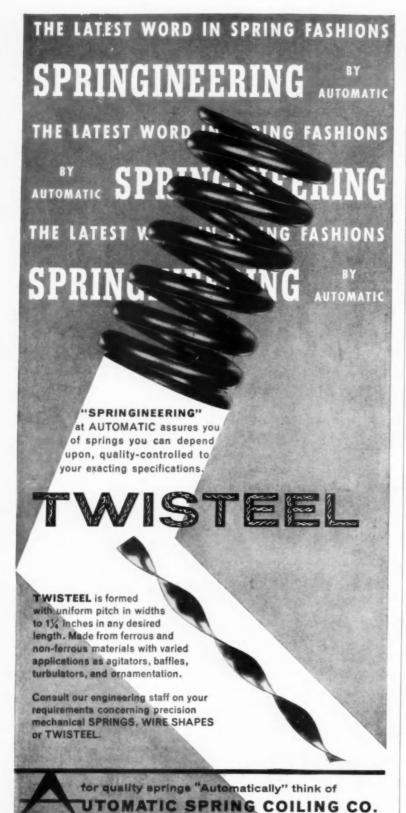
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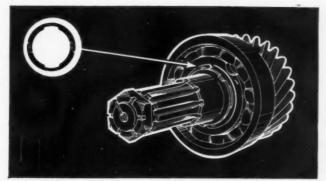
CALENDAR

OF COMING SHOWS AND MEETINGS

Society of British Aircraft Con- struction, 20th flying display and exhibition, Royal Aircraft Establishment, Farnborough, England Sept. 7-13
anguna
ASME Applied Mechanics Div., West Coast Conference, Stan- ford Univ., Stanford, Calif. Sept. 9-11
Society of the Plastics Industry, Inc., Midwest Section Confer- ence, French Lick Sheraton Hotel, French Lick, IndSept. 10-12
Pressed Metal Institute, annual meeting, Estes Park, ColSept. 13-17
SAE National Farm, Industrial Construction and Machinery Meeting, Milwaukee, Wis. Sept. 14-17
American Die Casting Institute, an- nual meeting, Edgewater Beach Hotel, Chicago, IIISept. 16-17
National Petroleum Association an-
National Petroleum Association, an- nual meeting, The Traymore, Atlantic City, N. JSept. 16-18
Atlantic City, N. JSept. 16-18
National Industrial Conference
Board, 7th marketing conference, Hotel Waldorf - Astoria, New York, N. YSept. 16-18
New York, N. Y Sept. 16-18
Seventh Annual Engineering Man- agement Conference, Statler Hilton Hotel, Los Angeles, Calif. Sept. 17-18
agement Conference, Statler
Hilton Hotel, Los Angeles, Calif. Sept. 17-18
Malleable Founders Society Industry Meeting, Hotel Sheraton-Cleve- land, Cleveland, O. Sept. 18
land, Cleveland, O. Sept. 18
International Automobile Show, Frankfort, GermanySept. 17-27
Steel Founders' Society of America,
Steel Founders' Society of America, 57th fall meeting, The Home- stead, Hot Springs, VaSept. 21-22
Instrument Society of America, 14th annual instrument-auto- mation conference and exhibit,
International Amphitheater, Chicago, IIISept. 21-24
Chicago, IIISept. 21-24
Industrial Nuclear Technology Con-
ference, Morrison Hotel, Chi- cago, III
American Welding Society, national
American Welding Society, national fall meeting, Sheraton-Cadillac Hotel, Detroit, MichSept. 28-Oct. 1
Paris Automobile ShowOct. 1-11
Institute of the Aeronautical Sci-
ences, Anglo-American Confer- ence, Hotel Astor, New York, N. Y
N. YOct. 5-16
American Vacuum Society, sixth
national symposium on vacuum technology, Sheraton Hotel,
Philadelphia, PaOct. 7-9

West Thorndale Avenue - Chicago 30, Illinois

ASTE semi-annual meeting, Chase-Park Plaza Hotels, St. Louis,



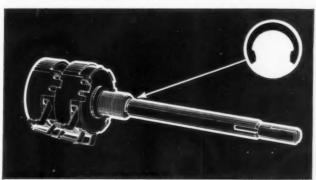
Heavy duty transmission design simplified. On this dual axle drive for trucks, a Truarc Series 5107 ring locks bearing on drive shaft. Interlocking ring design won't dislodge under heavy torque... is also recommended for high rpm. applications.



Rings replace machined shoulders, collars, set screws. That's what original design of this pneumatic temperature transmitter called for. Series 5139 Prong-Lock® ring with bowed design compensates for accumulated tolerances in parts, provides sufficient friction to prevent rotation under vibration. At the same time two Waldes E-rings position and lock adjustment screw to face plate.



Reinforced aluminum ring gives design advantages on louver windows. Waldes Truarc Series 5144 reinforced rings of aluminum secure hinge pins, eliminate costly riveting in linkage of louver type window. Ring design provides large bearing shoulder. Reinforced construction has 5 times the gripping strength of standard E-ring construction, allows use of non-corrosive aluminum.



Ring acts as locking shoulder. Holding the threaded ferrule on this potentiometer shaft is a Truarc Series 5103 Crescent® ring. Crescent ring design with low shoulder provides ample clearance for assembly of panel locknut. It is less costly than a machined shoulder, more effective, quicker to install, easier to remove than the C washer previously used.

Designing with radially assembled Waldes Truarc retaining rings

solve varied product design problems—save machining, materials, parts and labor

Radially assembled retaining rings, which snap onto a shaft at right angles to its axis, greatly extend the range of products on which retaining rings may be used to simplify design and save parts or labor costs.

For example, rings for radial assembly can be used in applications where it is impossible to install a ring axially over the end of a shaft. Certain types are designed to accommodate shafts of relatively wide tolerances. Others described below may be used to provide a sizeable shoulder on a shaft.

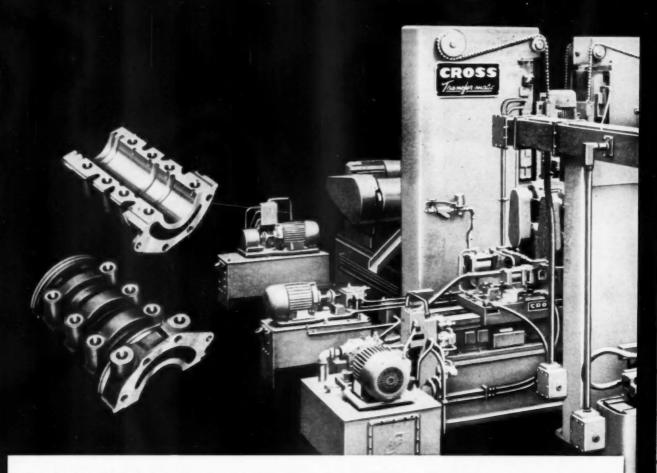
The four applications shown here provide an indication of the wide range of products using radially assembled rings. The rings themselves are basic Truarc types each having specific design features. The high shoulder of one provides a large bearing surface on small diameter shafts; the low shoulder of another is ideal where clearance is limited. A third has an interlocking design which prevents it from being dislodged under torque or high rpm. A fourth can be used against rotating parts at the same time it provides spring tension.

These are but four of Truarc's fifty functionally different types of retaining rings with up to 97 sizes within a single type, six metal specifications and thirteen different finishes. Special hand, magazine, and semi-automatic applicators as well as grooving tools are also available to speed production. The entire line, together with over 70 typical applications, is described and illustrated in the new catalog RR10-58—yours for the asking. And call on us for design assistance on your specific project . . . a Waldes Truarc engineer will be glad to help. Waldes Kohinoor, Inc., 47-16 Austel Place, Long Island City 1, N. Y.



TRUARC RETAINING RINGS...THE ENGINEERED FASTENING METHOD FOR REDUCING MATERIAL, MACHINING AND ASSEMBLY COSTS

A New Approach For Processing Crankshaft Bearing Caps



This Cross Transfer-Matic, built for an European automotive company, provides an entirely new approach to machining crankshaft bearing caps. Capacity of the 30 station machine is 109 sets (436 pieces) per hour at 100% efficiency.

The parts, cast in clusters of four, are broached in preparation for the operations performed by the Transfer-Matic. Unlike American designs, the No. 1 and 4 caps require felt seal grooves and the No. 1 cap has a pattern of four holes in the end for mounting a fan belt cover.

New Methods

The clusters are indexed by a lift and carry transfer mechanism with the crank-

shaft axis at right angles to the transfer movement. The felt seal grooves are machined by standard cross-facing heads mounted on horizontal positioning units. The fan belt cover hole operations are also performed horizontally. The bolt holes, bearing lock notches, oil slinger grooves and the milling of a lug on the No. 1 bearing cap are all machined vertically.

New Sawing Unit and Fixture

At the very end of the machine, the clusters are shuttled into a special sawing fixture where they are cut into individual pieces and ejected. The fixture, a new design, holds the parts with the joint face at a 40° angle. This arrangement permits the chips to fall free of

the clamping mechanism and substantially reduces the overhang of the sawing cutters. During the sawing operation, locating pins are inserted in all of the bearing cap bolt holes to provide maximum rigidity and to prevent pinching of the saws as they withdraw from the work.

The machine is constructed to JIC Standards, has complete interchangeability of all standard and special parts, and is constructed out of standard Cross building blocks for optimum flexibility. A Cross Machine Control Unit equipped with Toolometers programs tool changes to reduce machine downtime. All tools are pre-set in standard Cross tool setting fixtures.

Another Automation First by Cross



Established 1898

THE (S | R (O) S | S |

First in Automation

PARK GROVE STATION . DETROIT 5, MICHIGAN



Challenging Engineering Opportunities at CATERPILLAR

be a part of the company building the world's most complete line of earthmoving equipment



Find the satisfaction of growth and stability within a growth company - where imaginative men are creating products for highway construction - industry - farms national defense - products which build a better world.



Caterpillar offers top ranking Research and Development opportunities - stimulating assignments - professional

and personal advancement. You'll associate with the leaders and pioneers in this field - and have at your command the finest equipment, laboratories and de-



velopment facilities. Please write us, telling all about yourself. Inquiries are confidential,

of course.

(Below - New Caterpillar Technical Center presently under construction)

responsible positions available in RESEARCH - DESIGN DEVELOPMENT

GAS TURBINE LABORATORY Design, ignition, fuel and combustion systems,

ENGINE DEVELOPMENT LABORATORY Fuel injection, turbocharged engines, combustion, etc.

VEHICLE COMPONENTS LABORATORY New power shift transmissions, transmissions, controls, clutches, final drives.

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PRODUCT AND APPLICATION ENGINEERING DESIGN

Engines, systems, fuel injection, tractor, trans-mission, vehicle configuration, earthmoving ma-



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John A. Myers - Al-99

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PEORIA, ILLINOIS



Readers' opinions or requests for additional information on material appearing in the editorial pages of AUTOMOTIVE INDUSTRIES are invited for this column. No unsigned letters will be considered, but names will be withheld on request. Address Letters to the Editor, AUTOMOTIVE INDUSTRIES, 56th & Chestnut Sts., Philadelphia 39, Pa.

MILITARY VEHICLES

I was delighted to see the release of General Lynde's address at the May meeting of the Combat and Tactical Vehicle Division of the American Ordnance Association in the July 1 issue of AUTOMOTIVE INDUSTRIES. Let's see more of this; I feel it can do a substantial amount of good.

A. A. Parquette Executive Engineer Special Military Vehicles Ford Motor Co. Dearborn, Mich.

STANDARDS SLIPS

I have a critical comment to make on the list of personnel as they are shown in your July 15 issue article "World-Wide Markets Loom Ahead for American Automobiles." I have noticed some misspelled names, namely, Heinen, Catto, and Lang. In addition, a more serious error is that Mr. William Weirs is shown as a member of ASA B 32, whereas Mr. Weirs passed away five or six years ago. Mr. H. C. Pratt is now a member of the committee replacing Mr. Weirs.

Joseph Gurski Manager Chemical and Metallurgical Laboratory Services Ford Motor Co. Dearborn, Mich.

• Our apologies to Messrs. Heinen, Catto and Lang—Ed.

Please refer to July 15, 1959 issue, page 63 ("World-Wide Markets Loom Ahead for American Automobiles"), wherein C-40 states "Representation Vacant."

Mr. H. D. Wilson, Ford Motor Co., is SAE representative on C-40 and

was active in the present ASA version of the SAE Storage Battery specifications.

H. C. Riggs Secretary, ASA C-40 Industrial Div. Electric Storage Battery Co. Philadelphia, Pa.

 Please excuse the omission, Mr. Wilson—Ed.

BATTERY CHARGER

In the AI Tabloid column on page 25 of your April 15, 1959 issue, you mention a Texas company which is marketing a device called "Gen-O-Drive." We have seen no reference to this device in any other publication to date, and are anxious to obtain the specific name and address of the manufacturer.

E. G. Gilbo Chicago Rawhide Mfg. Co. 1301 Elston Road Chicago 22, Ill.

• The manufacturer of the Gen-O-Drive is Consolidated General Products, P. O. Box 7425, Houston 8, Tex.—Ed.

ADHESIVE BONDING

In the July 1 and July 15 issues of AUTOMOTIVE INDUSTRIES, you published Part I and Part II of an article captioned "Cutting Costs with Adhesive Bonding." We found this article to be very interesting and informative and would like to secure five copies.

L. R. Sturgeon
Sr. Production Engineer
Process Development
Dept.
Fisher Body Div.
General Motors Corp.
Detroit, Mich.
(Turn to page 134, please)



IN FASTENERS SOUTHERN IS Capacity

Southern Screw's capacity to manufacture over 16,000,000 fasteners per day takes care of a lot of orders. Southern prides itself, too, on its capacity to expedite small to medium quantity orders with the same care with which large orders are handled.

You are invited to sample Southern Screw's capacity to serve you to your complete satisfaction with fasteners of highest quality. Write for Southern's current Stock List. Address Southern Screw Company, Box 1360, Statesville, North Carolina.

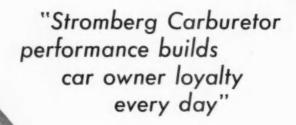
Tapping Screws • Wood Screws Machine Screws & Nuts • Stove Boits • Carriage Bolts • Dowel Screws Hanger Bolts • Drive Screws

> Manufacturing and Main Stock in Statesville, North Carolina

> > Warehouses:

New York . Chicago . Dallas . Los Angeles





"Sure . . . an owner could easily
switch to another make car just
because he's been having
carburetor trouble. In cases of
starting and stalling difficulties . . .
and disappointing gas mileage—
the average car owner
blames the carburetor. And
the car manufacturer gets
a 'going over', too."

"You're right, Bill, so why
take chances with anything but
the best in carburetors? And,
for over forty years, that's been
STROMBERG*. It's built by the
leaders in automotive fuel
systems—Bendix-Elmira."

PREG. U. S. PAT. OFF,

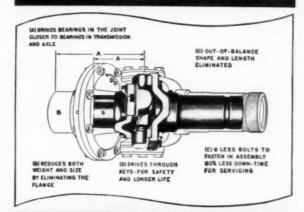
Bendix-Elmira

ECLIPSE MACHINE DIVISION ELMIRA, NEW YORK



MECHANICS
LESS PARTSLESS
ASSEMBLY
TIMELESS
WEIGHT
TIMEMECHANICS
LESS WEIGHTMORE
PAYLOADHAULS MADE
BY TRUCK

You Are PAYING For MECHANICS JOINTS



Why Not Give YOUR Truck MECHANICS Advantages?

Every time you use a joint that requires unnecessary attachments and extra assembly time and labor, you are paying for MECHANICS Roller Bearing UNIVERSAL JOINTS advantages—but are not getting the benefit of them. And you are forcing your truck to carry unnecessary DEADWEIGHT that should be devoted to PAYLOAD.

MECHANICS Roller Bearing UNIVERSAL JOINTS eliminate the need for companion flanges—without sacrificing ease of assembly.

By taking full advantage of the MECHANICS design, a substantial weight reduction can be accomplished—at a point where fewer parts, minimum weight and faster assembly represent competitive advantages.

Let our engineers show you how this and other MECHANICS Roller Bearing UNIVERSAL JOINT features will benefit your new or improved models.

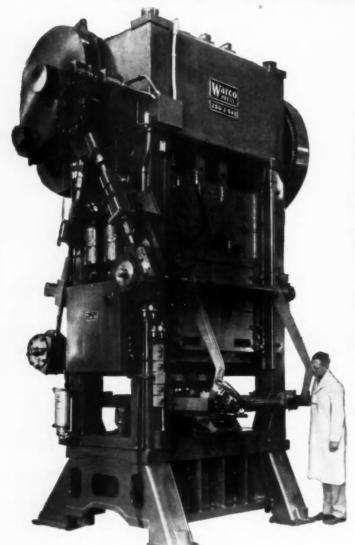
MECHANICS UNIVERSAL JOINT DIVISION

Borg-Warner * 2024 Harrison Avenue, Rockford, Illinois

MECHANICS Roller Bearing UNIVERSAL JOINTS

For Cars • Trucks • Tractors • Farm Implements • Road Machinery •
Aircraft • Tanks • Busses and Industrial Equipment

Warco automation



You can expect mechanical presses of unsurpassed quality when you specify Warco, for every Warco press is designed and custom built with machine tool precision. The result: Warcos work better, faster—with substantially reduced maintenance.

This typical Warco 250 Ton Double Eccentric Shaft Straight Side Press is being used by a leading farm equipment manufacturer to automatically feed and hot form the camber and accurately punch and countersink bolt holes in heavy gauge plow shares, discharging them automatically into a heat treating bath. Press slide incorporates a hydro-pneumatic overload device.

If you're considering press equipment, remember . . . if you want maintenance-free quality—you want Warco.





THE FEDERAL MACHINE AND WELDER COMPANY . WARREN, OHIO



Roebling Tire Bead Wire: Packaged for Maximum Benefit

The problems eliminated by this unique reel-less core packaging system are manifold. Loads are palletized two cores per pallet and may be stacked two or three high. This, plus the fact that you need not accumulate empty reels means storage space requirements are cut to less than half. You do away with all freight and handling costs on reels, the bother and expense of "bookkeeping" returnable reels, and the freezing of money in reel deposits.

This is typical of Roebling's advanced packaging methods—that makes handling Roebling high-quality wire so

much easier. For details on this efficient Roebling Tire Bead Wire packaging method, or information on other types of Roebling wire, write Wire and Cold Rolled Steel Products Division, John A. Roebling's Sons Corporation, Trenton 2, New Jersey.

ROEBLING

Branch Offices in Principal Cities
Subsidiary of The Colorado Fuel and Iron Corporation



Process Engineered

Chromate Conversion Coatings

Give you 5 additional benefits for Corrosion Protection—Paint Base—Decorative Finishing

A COMPLETE PROCESS ENGINEERED LINE

Developed for specific applications, there is an Iridite to provide the finish you desire, fit the equipment you have available and give the performance you require. Most Iridite coatings meet rigid military and civilian specifications.

2 EXPERIENCED TECHNICAL SERVICE

Our large field engineering staff is thoroughly familiar with chromate conversion coatings and related finishing operations. They'll help you check every step in your finishing operation to make sure you're getting the best possible finish on your products.

3 PRODUCT AVAILABILITY

Warehouses located in strategic industrial

areas enable us to provide you with fast, economical delivery on any Iridite.

4 ECONOMY

The superior performance of Iridite provides low final cost by extending operating life and lowering maintenance costs. In addition, Iridite gives you a finish that adds considerably to the value of your product. There's an Iridite to meet every cost and performance requirement.

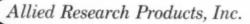
FACILITIES RESEARCH AND DEVELOPMENT

If you have an unusual application, we will gladly work with you. Our entire staff of experienced engineers and chemists, and our completely equipped facilities are at your service.

IRIDITE—a specialized line of chromate conversion coatings for non-ferrous metals. Apply by dip, brush or spray methods—at room temperature—manually or with automatic equipment. Forms a thin film which becomes an integral part of the metal. Cannot chip, flake or peel. No special equipment, exhaust systems or specially trained personnel required.

If you are using chromate conversion coatings to finish zinc, cadmium, aluminum, magnesium, silver, copper, brass or bronze — consider the above benefits of Iridite. For complete information, contact your Allied Field Engineer. He's listed under "Plating Supplies" in the yellow pages. Or, write for FREE TECHNICAL DATA FILE.





4004-06 EAST MONUMENT STREET • BALTIMORE 5, MARYLAND
BRANCH PLANT: 400 MIDLAND AVENUE • DETROIT 3, MICHIGAN
West Coast Licensee for Process Chemicals: L. H. Butcher Co.

Chemical and Electrochemical Processes, Anades, Rectifiers Equipment, and Supplies for Metal Finishing

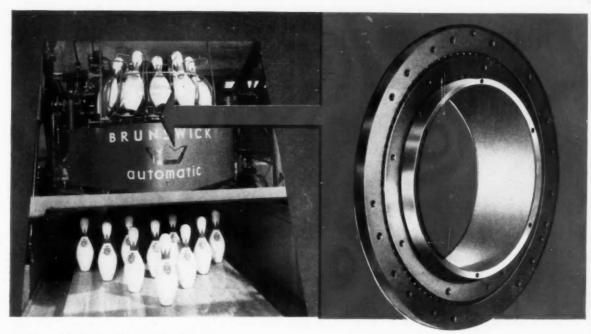












The HEART of this Brunswick-Balke-Collender AUTOMATIC PINSETTER

is an



Ball Turret Bearing

... chosen for accuracy, dependability and unfailing service on an exceptionally intricate piece of equipment—a marvel of design and production ingenuity.

The entire mechanism revolves on this one bearing. After collecting and elevating the pins, they are positioned in a revolving "turret" where they are held until the last pin is received. As this last pin drops through the center of the Aetna bearing, it activates the catch mechanism and pins are released into position in the "deck." The "deck" in turn sets the pins upright with correct spacing and arrangement on the alley bed ready for bowling.

Quick, dependable performance is the key to the success and widespread adoption of the Brunswick Pinsetter. It must function perfectly, steadily, accurately—game after game, day and night—without maladjustment, breakdown or delay—and it is in just such service that Aetna Bearings prove their stamina, perfect workmanship, accuracy and dependability. Despite the fact that the pins vary slightly in weight, the Pinsetter continues to perform smoothly and accurately on its main Aetna Bearing which remains in correct alignment at all times and operates quickly, smoothly, unfailingly load after load.

Equal performance and dependability are built into your products when you specify Aetna Ball and Roller Bearings. Call your local Aetna representative listed in the Yellow Pages of your Classified Telephone Directory, or write direct for General Catalog and Engineering Manual.

AETNA BALL AND ROLLER BEARING COMPANY



DIVISION OF PARKERSBURG-AETNA CORPORATION • 4600 SCHUBERT AVE. • CHICAGO 39, ILL.
In Detroit: SAM T. KELLER, 1212 Fisher Bidg.

ANTI-FRICTION SUPPLIERS TO LEADING ORIGINAL EQUIPMENT MANUFACTURERS SINCE 1916

Six ways **ELCIDE** 75* saves your plant time, work and money



LESS CUTTING OIL TO BUY. Elcide 75 stays effective *longer* than other bacterial inhibitors, increases the life of cutting oil emulsions up to 5½ times. You save on buying and handling.



FEWER DISPOSAL PROBLEMS. Disposal of spoiled emulsions is usually a costly, troublesome problem. By lengthening the life of cutting fluids, Elcide 75 saves you frequent hauling.



FEWER CLEANINGS OF MACHINES. Bacteria in coolants produce sludge that clogs machines. By controlling bacteria effectively, not halfway, Elcide 75 prevents sludge, cuts downtime.



CONTROLS A WIDER RANGE OF BACTERIA. Elcide 75 is a combination of proved bacterial inhibitors. No other inhibitors on the market, singly or in combination, can equal its control.



FEWER HEALTH HAZARDS. By controlling a wider range of bacteria than other products on the market, Elcide 75 lessens danger of harmful, costly health problems in your plant.



LESS CORROSION OF TOOLS, PRODUCTS. Elcide 75 keeps coolants fresh, stops buildup of acid by-products that corrode machinery and products, means fewer plant repairs.



NO OTHERS COMPARE!

The reason: Elcide 75's exclusive combination of active ingredients—Sodium Ethylmercuri Thiosalicylate (Thimerosal) and Sodium o-phenylphenate.

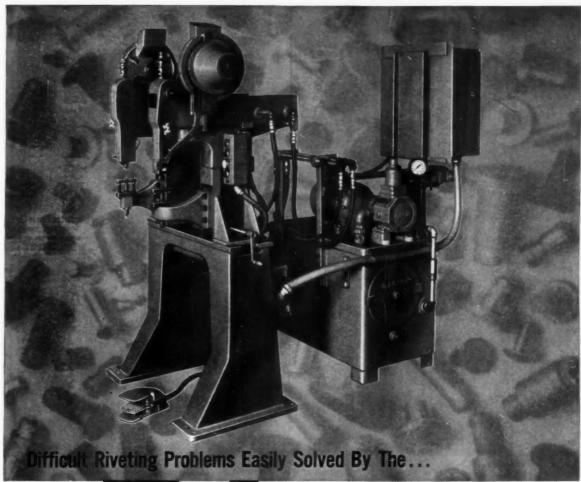


*Lilly's brand of bacterial inhibitor for cutting fluids

For more information or to place your order, phone or write:

ELI LILLY AND COMPANY • AGRICULTURAL AND INDUSTRIAL PRODUCTS
DIVISION • INDIANAPOLIS 6, INDIANA • PHONE MELROSE 6-2211

Circle 120 on Inquiry Card for more data



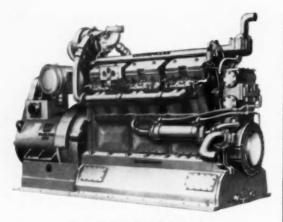
New HYDRAULIC DUAL RIVITOR

With Increased Riveting Production • Quality • Versatility

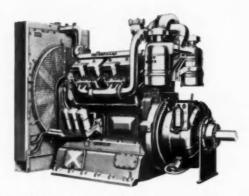
Added recently to the versatile T-J line of unit and production line riveting and clinching machines is the new Hydraulic Dual Rivitor. The Model HDR will set two ¼" solid steel rivets at once with adjustable spacing from 1-½" to 18" maximum, center to center, being fed from 10" hoppers. Operating cycle is approximately .8 second, at 420 P.S.I. oil pressure furnished from a hydraulic power unit with maximum of 1000 P.S.I. output. For complete specifications write to The Tomkins-Johnson Co., 2425 W. Michigan Ave., Jackson, Michigan for Bulletin HDR-4-59.

For information on other T-J Rivitors and Clinchors write for Bulletin No. 555.



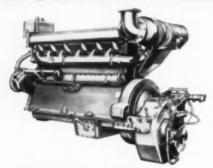


Caterpillar D397 Series D Electric Set

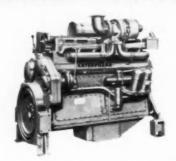


Caterpillar D375 Series D Industrial Engine, Torque Converter Power Unit

AIRESEARCH TURBOCHARGER SYSTEMS



Caterpillar D342 Series C Marine Engine



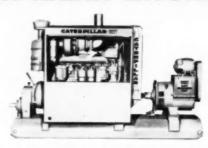
Caterpillar D353 Series C Industrial Engine

DESIGNED FOR CATERPILLAR ENGINES

Through the close cooperation of AiResearch and Caterpillar, advanced turbocharger systems have been developed to match each of these production diesel engines covering a wide range of horsepower and applications.

Engine horsepower has been substantially increased to meet higher power demands without penalty of larger size and more weight. For example, the intermittent 415 H.P. Caterpillar D397 industrial engine has been turbocharged to 575 intermittent H.P. (650 H.P. maximum) ... 200 intermittent H.P. Caterpillar D342 industrial engine turbocharged to 260 intermittent H.P. (320 H.P. maximum).

Other important advantages of the AiResearch air-cooled turbochargers: increased horsepower to sea level rating...lower specific fuel consumption...less smoking and noise...cleaner and cooler running engine...reduced maintenance costs.



Caterpillar D337 Series F Mechanical-Electrical Engine

These advanced turbocharger systems underwent thousands of test hours on the job by Caterpillar and are now in quantity production.

AiResearch is the most experienced company in the design, development and production of small turbomachinery. We will be happy to discuss turbocharger applications for your equipment.



CORPORATION

AiResearch Industrial Division

9225 South Aviation Blvd., Los Angeles 45, California

DESIGNERS AND MANUFACTURERS OF TURBOCHARGERS AND SPECIALIZED INDUSTRIAL PRODUCTS



Unnoticed Changes in a Metal Cleaning Operation Often Affect Solvent Consumption

We were recently asked by a large user of trichlorethylene for a sure procedure for spending the least number of dollars for this chemical.

The procedure necessary to assure the most economical use of trichlorethylene is neither mysterious nor difficult, but it is precise.

To understand it, it is necessary to accept this fact:

- 1) When a change occurs in the product, or
- 2) When a change occurs in manufacturing, or
- 3) When a change occurs in racking, or
- 4) When a change occurs in the human element, or
- 5) When a change occurs in the machine -

a change will also occur in the quantity of trichlorethylene being consumed. It is not unusual for one of these changes to occur every month, and many times it will go unnoticed. The *only* procedure that will get the *best* result is:

- 1) To ascertain the necessary facts, and
- 2) Have expert appraisal of those facts.

A program can be set up to cover both. We have been doing it for 27 years. We would be very happy to institute such a program for you.



Depend on DETREX for

Every Metal Cleaning

and Processing Need
 ▶ PERM-A-CLOR NA

(Trichlorethylene)

Solvent Degreasers
 Ultrasonic Equipment

Industrial Washers
 Phosphate Coating Compounds

PAINTBOND Compounds
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Alkali and Emulsion Cleaners
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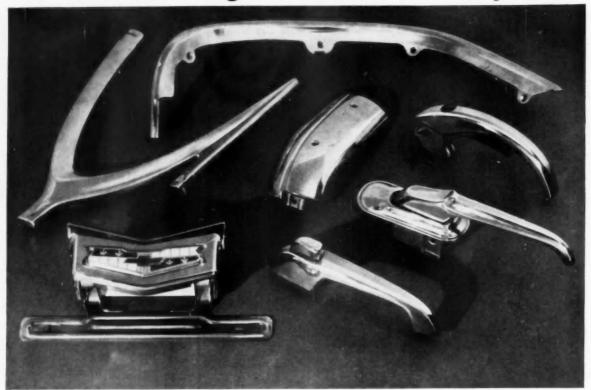
DETREX

CHEMICAL INDUSTRIES, INC.

Box 501, Dept. Al-959 Detroit 32, Michigan

World's Largest Exclusive Producer of Cleaning Chemicals and Equipment

Problem-Solving Products from Republic:



Illustrated are parts and molding fabricated from Republic ENDURO Stainless Steel by Keeler Brass Company, Grand Rapids, Michigan.

STAINLESS STEEL QUALITY AND METALLURGICAL SERVICE HELP FABRICATOR STAY COMPETITIVE...AT A PROFIT

"Republic Steel Corporation's consistently high quality stainless steel, backed by excellent metallurgical service, enables us to maintain a profitable position in the highly competitive automotive part and trim business", says Mr. Julian Kempski, Purchasing Agent, Keeler Brass Company, Grand Rapids, Michigan. The company fabricates a wide variety of parts and trim from Republic ENDURO® Stainless Steel.

Republic Stainless Steel quality has to be good to meet Keeler's strict requirements. Some of the parts are subjected to the most severe forming operations possible. Physicals must be exact to meet forming, bending, and drawing requirements . . . and to eliminate scrap loss. The chemistry has to be just right

for maximum corrosion-resistance in the end product.

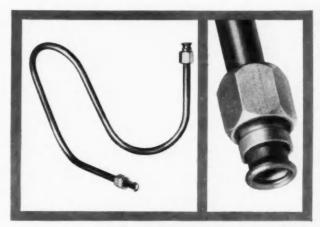
Controlled rolling and annealing operations performed by Republic result in quality stainless steel with uniform flatness, fine surface, and desirable physical properties for fabricating. These features, combined with Republic metallurgical service, enable Keeler to maintain profitable production in a highly competitive market.

Republic's famed 3-Dimension Metallurgical Service is available to all stainless steel users. Field, mill, and laboratory metallurgists, working as a team, will assist you in selection, application, and processing of the right stainless steel for your requirement. There is no obligation. Mail coupon for more information.



REPUBLIC NYLOK® STUDS SOLVE FASTENING PROBLEM for Gravely Tractors, Inc., Dunbar, West Virginia. Problem: Find a dependable fastening method for tractor-attached rotary cultivators. Fastener must withstand constant shocks and pounding of rotary cultivating. Solution: Use Republic Nylok Studs. A special nylon insert assures positive locking at any position, even under severe shock, vibration, tension. Prevents all play. Utilizes metal-to-metal contact of opposing threads for locking. Republic Nylok Fasteners—studs, nuts, cap screws—resist heat; cold, moisture. Can be re-used. Mail coupon for full facts.

REPUBLIC COLD DRAWN ALLOY BARS SOLVE KINGPIN PROBLEM in White Motor Trucks. In maintaining the safety of these trucks, their drivers, and the millions of dollars worth of merchandise they carry each year, White produces critical kingpins of 1% on round Republic 8620 Alloy Cold Drawn Bars. Republic Cold Finished Alloy Steels are available in every standard analysis, plus many specials. For further information, mail coupon.



REPUBLIC ELECTRUNITE® HYDRAULIC FLUID LINE TUBING SOLVES FAILURE PROBLEM resulting from longitudinal or transverse cracks. No failure from these causes has been reported in the history of the product. ELECTRUNITE Fluid Line Tubing gives you more tube per dollar. It provides utmost uniformity, assures better bending and flaring characteristics, offers appreciable savings in downtime. Available in all sizes shown in JIC Standards Book, and meets the requirements of SAE Standard. Available in an even wider range of sizes produced to our specification HL-1 (which meets all test requirements of JIC Standards). Mail the coupon for complete facts.



REPUBL REPUBLIC STEE DEPT. AI-8106 1441 REPUBLIC ID Have a Stainles

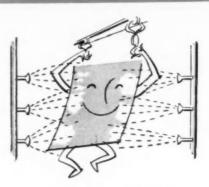
World's Widest Range of Standard Steels and Steel Products REPUBLIC STEEL CORPORATION
DEPT. Al-8106
1441 REPUBLIC BUILDING • CLEVELAND 1, OHIO

Have a Stainless Steel Metallurgist call.
Send more information on:
Stainless Steel
ELECTRUNITE Hydraulic Line Tubing
Nylok Fasteners
Cold Finished Alloy Steels
Name
Title
Company
Address
City
Zone
State

DeVilbiss...the one source

CLEANING AND SURFACE-PREPARATION EQUIPMENT

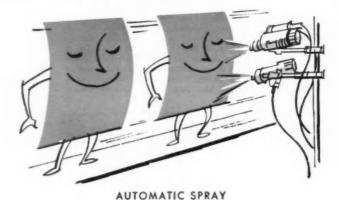
DeVilbiss offers both standard and customdesigned power washers to meet your exact operating problem. We work closely with your engineers to match machines to cleaning processes, surface treatments, solution temperatures, and quantities of chemicals required.



POWER SPRAY CLEANING AND TREATING

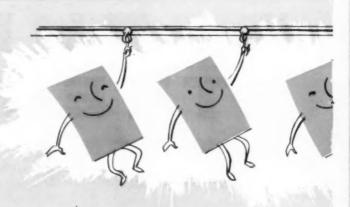
COATING EQUIPMENT

Whether you need a single manual spray gun or an entire coating system complete with enclosures, spray booths and air-replacement systems—DeVilbiss can handle your requirements for any type application. Design, manufacture, and installation are a single responsibility. You get greater value in the initial purchase, and peak performance with high efficiency is assured by the combination of matched equipment and fully integrated engineering.

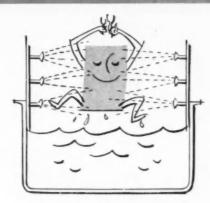


INDUSTRIAL OVENS

Each DeVilbiss heating or drying oven is designed specifically for the job. They're available in all types—compartment, belt, floor, multi-pass vertical, bottom-entry, A-type, vertical-tower, and roof—using steam, gas, oil, or electricity. All incorporate features for minimum maintenance and high utilization of heat; comply with code, underwriters' requirements.



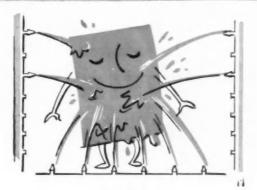
for all finishing equipment!



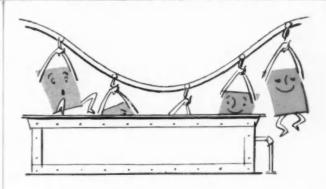
COMBINATION IMMERSION AND POWER SPRAY



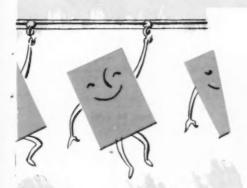
AGITATED IMMERSION



FLOW COATING



DIP COATING



For a complete finishing system, or individual component, call DeVilbiss for one-source service. Engineering, installation, and service facilities are available coast to coast.

DEVILBISS

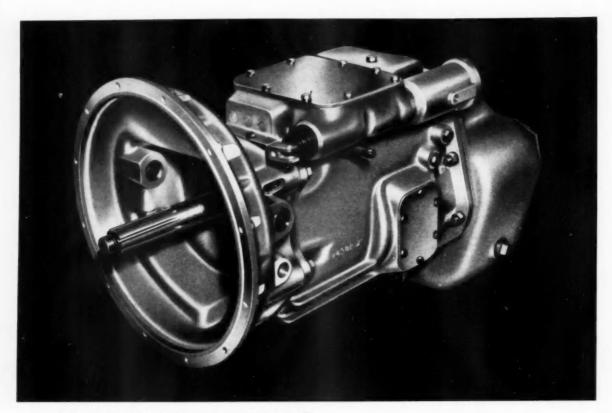


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Barrie, Ontario • London, England São Paulo, Brazil Branch Offices in Principal Cities

INDUSTRIAL POWER WASHERS - OVENS DUST COLLECTORS - MIST-COOLANT UNITS - SPRAY EQUIPMENT - HOSE & CONNECTIONS - FLOW & DIP COATERS SPRAY BOOTHS - AIR COMPRESSORS





NEW LIGHTWEIGHT CLARK 9-speed TRANSMISSION

56 years of manufacturing experience... millions of heavy-duty transmissions...

This is the experience background of Clark's new, lightweight 9-speed transmission . . . a background which gives you:

- Light weight. Transmission, complete, weighs only 515 lbs.
 All aluminum housings.
- Designed for highway trucks in the 250 to 300 hp range.
- 9 speeds with ratios matched to the demands of modern

diesel hauling. Low-gear ratio, 9.35 to 1, starts heavy loads easily.

- Drop-type output shaft, making possible shorter vehicle wheelbase.
- Power-assist shift simplifies hookup, cab to transmission . . . greatly reduces shifting effort . . . yet driver retains complete control at all times.
- Low silhouette, provides clearance under cab or trailer.
- Standard SAE power takeoff openings on both sides.

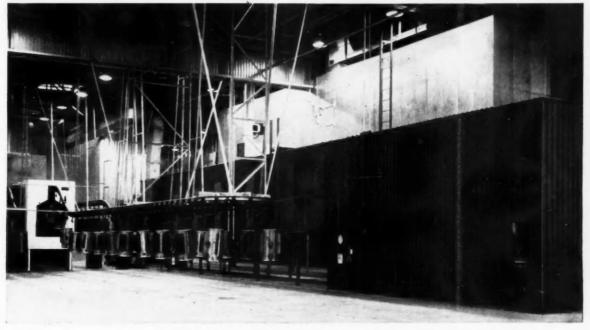
CLARK EQUIPMENT

For more facts, clip this coupon to your letterhead and mail to

CLARK EQUIPMENT COMPANY

1300 Falahee Road, Jackson 2, Michigan

FINISHING SYSTEMS...



Mahon Combined Flow Coating and Spray Painting Machines Paint Transformer Tanks Automatically at Westinghouse!



In a complete automatic Finishing System, recently installed by Mahon in the Westinghouse plant at Athens, Ga., transformer tanks with recessed bottoms are painted automatically, inside and outside, in an inverted position as they pass through specially designed, combined Flow Coating and Automatic Spray Painting Machines—tanks are rotated as they pass through the two simultaneous coating processes. Four coats of paint are applied and each is oven-baked on one continuous line that passes through Four Automatic Painting Machines—one is shown at left.

Other Mahon equipment in this Westinghouse plant includes a Transformer Coil Dehydrating Oven and a second Complete Mahon Finishing System for applying the final coat on completely assembled transformers.

If you are considering a new finishing system, or any unit of finishing or processing equipment, you will want to discuss methods, equipment requirements and possible production layouts with Mahon engineers . . . you'll find them better qualified to advise you, and better qualified to do the initial planning and engineering which plays such an important role in the ultimate operating efficiency of specially designed equipment of this type.

THE R. C. MAHON COMPANY • Detroit 34, Michigan Sales-Engineering Offices in Detroit, New York, Chicago and Los Angeles

Engineers and Manufacturers of Complete Conveyorized Finishing Systems. Metal Parts Washers, Metal Cleaning and Rust Proofing Machines, Conveyorized Cleaning and Pickling Machines; Dry-Off Ovens, Spray Booths, Electrostatic Spray Enclourers, Flow Coaters, Dip Coaters, Finish Baking Ovens, and Paint Stripping Equipment; Core Ovens, Soldering Ovens, Dehydrating Ovens, Heat Treating and Guenching Equipment for Aluminum and Magnesium, Dust and Fume Control Installations, and Many Other Units of Special Plant and Production Processing Equipment.

See Sweet's Plant Engineering File for Information and Representative Installations, or Write for Catalogue A-659

MAHON

NAT'S
quick facts
about
Fasteners...

UNDERCUT

CUSHION

NEOPRENE
WASHER

SEAL

With TUFF-TITE Fasteners ...it's the cushion control that counts!

You can be very sure of this, in using Tuff-Tite® Cushioned Fasteners.

The preassembled neoprene washer won't ooze off in just any old direction when it's compressed under the head.

It will stay put and do what it's intended to do:

- Form a firm, even cushion under the head Seal off the fastener hole
- Prevent fluid leaking past the thread
 Dampen vibration poises around
- Dampen vibration noises around the head
 Protect fine finishes against marring and crazing

... because Tuff-Tite's undercut head and tough molded neoprene washer assure consistent cushion control. The undercut confines the spread as the washer is compressed, and the molded shape guides the flow into the top threads, to seal the hole.

It's as simple and as certain as that, for any application requiring fastener sealing and cushioning. Tuff-Tite Fasteners* are available as Machine, Self-Tapping, or Wood Screws, as Stove and Roofing Bolts, and can also be made as Special Fasteners. We'll be glad to work with you on your possible applications.

*More details and specifications on standard types and sizes are given in the Tuff-Tite Fastener folder. Write for your copy.





The National Screw & Mfg. Company · Cleveland 4, Ohio

California Division, The National Screw & Mfg. Company • 3423 South Garfield Avenue, Los Angeles 22, California

Another new development using

B.F.Goodrich Chemical raw materials



DAMPENS VIBRATIONS ON NEW DC-8

The roar of jet engine power and speeds of jetliner operation are creating entirely new design problems for engineers charged with dampening vibration and sound. Douglas engineers are solving the problem with a new flexible fabric which dissipates the low frequency vibrations that ordinary acoustical material can't screen out.

The material consists of either cotton or glass fabric coated with a Geon polyvinyl material that has been compounded with powdered lead. This construction provides sufficient barrier mass to dampen and to provide increased transmission

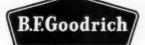
loss, yet offers considerably improved flexibility—unlike former materials that actually contained a potentially friable sheet of lead as an inner core or a central layer.

Geon has proved best for this application because it disperses readily in the coating formula, providing excellent coating characteristics and a good bond with the fabric. Versatile Geon provides coatings for many products—from metal to non-woven fabrics. Or you can use Geon to make products like insulated wire, pipe, or foam. A wide variety of resins, compounds, latices and polyblends is available. For the type

best suited to improve your product or application, write Dept. AQ-4, B.F.Goodrich Chemical Company, 3135 Euclid Avenue, Cleveland 15, Ohio. Cable address: Goodchemco. In Canada: Kitchener, Ontario.



B.F.Goodrich Chemical Company a division of The B.F.Goodrich Company



GEON polyvinyl materials . HYCAR rubber and latex . GOOD-RITE chemicals and plasticizers

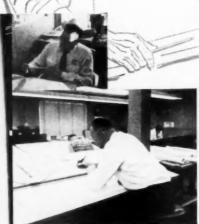


plating progress *









world's largest plating supplier



corporation detroit 11, michigan

When our engineering design team goes to work on a problem it draws upon practical experience — yours and that of others in the industry added to our own well-tested knowledge. In our forward planning of new and better equipment to meet those problems we give full consideration to proven methods presently in use as an aid in directing our research. We then look for a better way.

The top minds of the electrical, engineering and chemical fields who form the team are constantly striving to provide you with speeded production, improved plating quality and, importantly, reduced labor and operating costs.

The result of their advanced thinking, of countless pilot machine models built, torn down and rebuilt, of exhaustive experimentation and testing is the finest, most efficient and carefully engineered plating equipment...designed by Udylite to produce top product and top profit for you.

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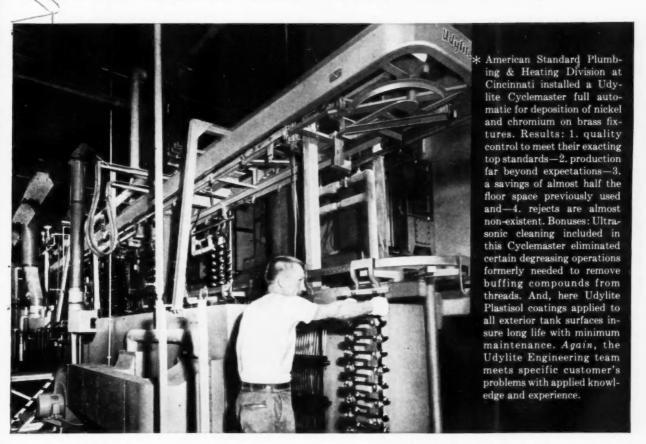




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NEWS

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September 1, 1959

Vanishing Medium Price Car

Detroit Wonders What Will Happen When Compact Car Comes of Age

Is the medium-price car on its way out?

A great many Detroiters think so, and they attribute its decline to a revolution in American taste—a radical upheaval that began several years ago and has not yet run its full course.

The small car, they believe, is merely another symptom of this change, but it well may hasten the dissolution of the medium-price field as a distinct segment of the U. S. passenger car market,

The decline of the medium-price class began just a few years ago when American Motors abandoned the Hudson and Nash lines in favor of the Rambler. Then Studebaker and Packard were consigned to the history books, to be replaced by another small car, the Lark.

Decline Continues

And the end is not in sight. In 1960, De Soto will curtail its offerings, and Edsel will bring out a smaller car only slightly larger than Ford's small Falcon. The larger Edsel, once considered a possible challenger in the mediumprice field, will pass from the scene within a year.

Dodge, feeling the squeeze from below, is bringing out a 118 in. wheelbase car, the Dart, to stave off the upward surge of Plymouth, Ford and Chevrolet.

Pontiac, No. One in the mediumprice field, may not be too worried. But Pontiac is bringing out a new model in 1960 to compete head on with the top offerings of Ford, Chevrolet and Plymouth.

The low-priced three two years ago began to pare off the low-end

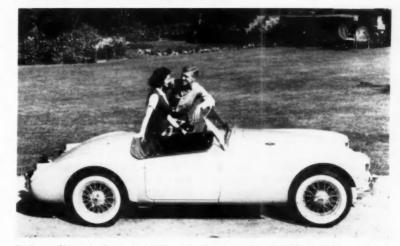
models to make way for the small cars. At the same time, they broadened their higher-priced offerings to move in still further on the medium-price cars, with Galaxie, Fury, and Impala.

Group Loses Identity

The result: The medium-price group has lost its identity in the scramble of "upper-lower," "lower-medium," "medium-lower," "upper-medium," etc.

There was a time, not so very long ago, when there were three separate price groups: high, medium and low. There was a certain amount of overlapping, but you

NEW MGA 1600 HAS BIGGER ENGINE



Body styling of the new MGA 1600, built by British Motors Corp., is unchanged, but engineering features include a larger engine than the 1500 and a new Lockheed brake system with 11-in. disks at front and 10-in. drum brakes at rear. Four cylinder engine has a 96.9-cu in. displacement, compression ratio of 8.3 to 1, and it develops 79.5 bhp at 5600 rpm. Car is available in sports roadster and sports coupe versions.



A new line of three-wheeled utility vehicles built in Japan by Daihatsu Kogyo Kabushiki Kaisha made its debut in Hollywood, Calif., recently. The try Trimobile, with a cargo capacity of more than 900 lb, is powered by a 10-hp single cylinder engine. Line includes an open-bed pickup, a hardtop panel delivery truck, and a basic tractor vehicle. Prices start at \$985.

could pretty well peg a make of car to one price group or another.

At the top, and fairly well out of reach of most prospective buyers, were the Lincolns, Cadillacs. Chryslers and Packards. The bulk of the low price sales came from the Fords, Chevrolets, Plymouths and, perhaps, Studebakers.

And in between you could clearly see Mercury, Buick, Oldsmobile, Pontiac, Hudson, Nash, Dodge, and DeSoto as medium-price cars.

The gap between Ford and Lincoln was a big one, so there was a clear need for Mercury in between. Likewise the gap between Chevrolet and Cadillac warranted the Buick, Oldsmobile, and Pontiac lines.

"Luxury" Options Available

Today, a Plymouth, Ford or Chevrolet buyer can have nearly all the options available on the "luxury" Chryslers and Imperials, Lincolns and Continentals, and Cadillacs. He can have power steering, power brakes, power windows and power seats—V-8 engine, tinted glass, automatic transmission, and back-up lights.

He pays extra, of course, for the options that generally are standard equipment on the luxury cars—but this narrows the price gap between high and low, putting the squeeze on the medium-price car.

If a customer bought a Ford in

1949, he got a car that measured 196.8 in. bumper to bumper, and 64.7 in. pillar to post. His car gave him 40 in. for his legs and 57.5 in. for his hips in case he should need that much. He had his choice of a six-cylinder engine with 95 hp, or a V-8 with 100 hp.

The Lincoln buyer, on the other hand, could get a car 220 in. long, 79 in. wide, with 42 in. front leg room and 60 in. across the front cushion. His V-8 (standard equipment) developed 152 hp—52 per cent more.

The Ford customer's car has grown 11.2 in. longer since 1949, and a full 12.1 in. wider. But the Lincoln buyer's car has grown only 7.1 in. longer and only 1.1 in. in width.

Inside Ford has added 2.8 in. legroom and 2.9 in. in width. But Lincoln has added only 2.1 in. for the legs and only one in. for the front cushions.

Other Differences Narrow

The '59 Ford V-8 engine (standard on some models) is listed at 285 hp, or an increase of 185 per cent, while the 350-hp Lincoln engine is less than 120 per cent more powerful. The difference between the two has been narrowed to 18.5 per cent.

The product itself is closing in on Mercury. Beginning in 1961, Mercury will move down and join Ford on the same basic body, thus limiting its individuality in styling and proportions.

Chrysler in 1949 was 18 in. longer than Plymouth; today it is only 8 to 12 in. longer. Front leg room and hip room now are identical, erasing a 1949 Chrysler advantage of 1½ and 2 in. The '49 Chrysler offered a V-8 engine and automatic transmission, while Plymouth had neither. Today Plymouth has both.

Cadillac had a length advantage of up to 29 in, over the 1949 Chevrolet, not even considering the Cadillac limousine. This difference has been shortened to 14.9 in. Width advantage has been reduced from 5 in, to an inch or even less.

Chevrolet in 1959 actually has more front head and hip room than Cadillac, and leg room remains virtually identical.

But this certainly does not mean that all of the makes generally classified as "medium-priced" will disappear. Some, pushed from below, may succumb, but most will be with us for a long time to come.

And they probably will grow, but not enough to keep pace with overall market growth. Oldsmobile general manager Jack Wolfram predicted recently a numerical growth for the medium-price group, but he implied a loss of penetration as the total market grows in the years to come.

Rambler Is Ready

American Motors president George Romney says he is "anxious and ready" for competition from the Big Three in the compact car field. So ready, in fact, that he expects to take eight per cent of the total new car market in 1960 for a possible 560,000 sales.

For calendar 1960 he predicts total sales of compact and import cars will reach 2,250,000, with the compacts taking 1,750,000. Of these, he firmly expects Rambler to take the highest percentage.

CONTINUED

Romney believes the Big Three compact cars will be more like the Rambler American in product but closer to the Rambler Six in price. This would put the American, which will offer a new four door sedan in '60, in the best competitive position.

The Rambler Six, incidentally, has been shortened from 13/4 to 4 inches for 1960.

Romney indicated that, to build 560,000 cars in 1960, further planned expansion will be carried out in Kenosha. Current capacity is slightly more than half a million.

The AMC head forecasts that any loss of sales in 1960 as a result of the heavy competition in the compact car field will come in the medium price class. None of the others—Ford, Chevrolet, Plymouth and the present compact and import cars—should lose ground to the Big Three small cars, he added.

Pontiac Adds Series

Pontiac is adding a new series, the Ventura, in its campaign to boost total sales during 1960.

Semon E. Knudsen, division general manager and vp of General Motors, says Pontiac sales will total 405,000 cars this year but should widen to 425,000 in 1960 with the addition of the Ventura, plus styling and engineering improvements on the other models.

Ventura, priced between the Catalina and Star Chief series, is planned to compete directly with the Ford Galaxie, Plymouth Fury and Chevrolet Impala. Ventura will be available in four- and two-door hardtop models.

Knudsen's goal is to retain first place in the middle price group and second place in General Motors. The 1959 Pontiac, which he refers to as the "hardest hitting status symbol in the middle-price group," in fact captured third place in the industry in registrations for the first six months.

Model year production for the

RUSSIANS SHOW 7-TON DUMP TRUCK



Russia's newest heavy duty truck—the Ural-375—is a 7-ton dumper designed for construction and off-highway work. It is powered by a gasoline engine that develops 180 bhp at 3200 rpm. Drive is to all three axles with epicyclic reduction gears in the wheel hubs.

10 months through August 1 totaled 316,320 cars, a gain of 70 per cent over 1958.

Changes for 1960 include an improved rear suspension system with larger rubber bushings and redesigned shock absorbers. Air suspension, incidentally, is being discontinued as an option. Lower engine mounting, combined with the new GM slim Hydramatic transmission, reduces tunnel sizes in the front compartment two in, in width and one in, in height.

Valiant Prototypes

Chrysler Corp. built 32 prototypes of the new Valiant passenger car and 57 experimental versions of the Valiant engine, according to Alan G. Loof Bourrow, director of engineering. Chrysler developed the small car in a specially-occupied plant on Midland Ave, in Detroit, which was staffed by a 200-man task force since late July of last year.

Labeled "Project A-901," the

Valiant development program included more than one million manhours of engineering and some 750,000 miles of vehicle testing, Chrysler reported.

Studebaker Buys Again

Studebaker-Packard Corp. has purchased its second plastics firm, C. T. L. Inc. of Cincinnati. The company, which will operate as an S-P division, was purchased for cash from its founders, E. P. Warnken and M. N. Korelitz.

C. T. L. was formed for research in high temperature problems but now has become a manufacturer and fabricator of plastic components for aircraft and missiles. The company currently is developing heat shielding for project Mercury, the missile planned to launch a man into space. C. T. L. has supplied nose cone heat shielding for successful re-entries, including the Able and Baker monkey missile of last May 28.

NEWS

CONTINUED

Oldsmobile Aims for 13 Per Cent Sales Rise

Oldsmobile is aiming for a 13 per cent sales increase in 1960, and the division is making a strong bid for a share of the gasoline-mileageconscious market.

A redesigned engine, with reduced horsepower coupled with lower axle ratio, will give customers a 15 per cent savings in operation, according to Jack F. Wolfram.

The new engine, designated Regular Rocket, will be standard equipment on the Dynamic 88 series. Horsepower has been dropped from 270 to 240 on this model, and axle ratio is down to 2.87. Compression ratio is down to 8.75.

Design Changes

Design changes include combustion chamber contour, piston and camshaft, plus the lower compression ratio. Wolfram recently revealed engine details and other information on the '60 models at a press conference in Detroit.

Wolfram explained that the Regular 88 engine, even though it has a high compression ratio, is designed to operate on regular grade gasoline.

The Super 88 and 98 series will be powered by the Premium Rocket engine, with 394 cu in. displacement, 9.75 compression ratio and 315 hp, unchanged from this year. Axle ratios will be 3.03 for the Super 88 and 3.27 for the 98. Lower ratios will result in up to 7 per cent lower engine speeds.

1960 Models Shorter

Wolfram revealed that 1960 models will be shorter—1 in. for the 88 and more than 2 in. for the 98 series. Other dimensions, however, are unchanged from '59. The cars will be 15-30 lb lighter as a result of transmission and sheet metal changes.

Shorter overall length, coupled with sweptback design of front fenders and bumpers, will give up to 3\%4 in. more maneuverability in parking, Wolfram said.

Air suspension will not be available at first, but Wolfram expects an improved system will be ready by January.

Wolfram said that Oldsmobile sales so far this year are 21 per cent ahead of 1958, and penetration of the middle price class is up to 26 per cent. He predicted that industry sales will increase 10 per cent in 1960, hitting 6.9 million units, with the middle price class taking one-third to one-half of the gain.

The middle price class, which is running 16 per cent ahead of last year, will continue to increase sales numerically in the coming years, he predicted.

Checking Engine Rumble

Three General Motors engineers say that careful selection of gasoline and oil can check automobile engine "rumble," the low-pitched noise that comes with excessive pressure buildup during hill climbing or passing.

The engineers—R. F. Stebar, W. M. Wiese and R. L. Everett—explain that certain crankcase oils form combustion chamber deposits which cause more rumble than other oils.

The three told the International West Coast SAE meeting at Vancouver, B. C., that fuel affects rumble in two ways: by deposits it forms in the combustion chamber and by inherent resistance to deposit ignition when exposed to high temperatures and pressures during the compression stroke.

Fuels with phosphorous additives were found to be most effective in silencing rumble, they said, because lead-phosphorous compounds formed are less likely to cause deposit ignition.

Buick Sets High Goal

Buick's new general manager E. D. Rollert, has set a high goal for Buick for 1960: to sell 20 per cent more cars than in 1959 and to win the prestige position Buick "once enjoyed" in the medium price market.

Rollert says Buick's sales for 1959 calendar year will be between 280,000 and 290,000, a 10 per cent increase over last year. The 20 per cent boost in 1960 should give Buick sales in the neighborhood of 345,000 units.

Puick has gone "massive" again for 1960 in an effort to recoup its losses. A new concave grille, dual headlamps set side by side in the fenders, and new sculptured sheet metal give the front end a bigger, wider look than it had in 1959.

Rollert, speaking to the automotive press group in Flint, said that introduction of the American-built small cars would have no effect on Buick sales. He even predicted that the German-made Opel, which Buick sells in this country, will not be harmed by the U. S. entries.

Opel sales now are running at about 3200 a month, he said, but the car still is in short supply.

Rollert said that Buick's schedules call for production of 111,000 cars by the end of December, bringing the 1959 total to 272,000 cars. A year ago, production totaled 257,000. When peak production is reached in early October, Rollert expects employment will total about 18,000, or 4000 more than at the end of '59 production.

Automatic Pay Hike

More than one million U. S. hourly rated workers, most of them in the automobile, farm equipment and aircraft industries, receive an automatic two-cent hourly wage hike this month, reflecting higher living costs. The wage boost, called for in labor contracts, is based on the latest cost-of-living index released by the Bureau of Labor Statistics.

The index rose to 124.9 for July 15, three-tenths of a point higher than the June index and a full point higher than April 15. The index also was eight-tenths higher than the comparable 1958 figure.

Automatic News

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SEPTEMBER, 1959

ARMATURE SHAFTS MACHINED ON AIR-FEED AUTOMATIC



The Harley-Davidson Motor Co., is well known throughout the world for its complete line of motorcycles and motor-scooters. The latest addition to their line is the new Topper motor-scooter. Advanced design and quality craftsmanship, plus wise application of modern production machines and tooling techniques, have won this company wide recognition for their products.

Many of the precision parts for these motorcycles and motor-scooters are made on the nineteen Greenlee Automatic Bar Machines shown in the photograph. An excellent example of this is the 8-15/16 inch long generator armature shaft shown in the tooling layout.

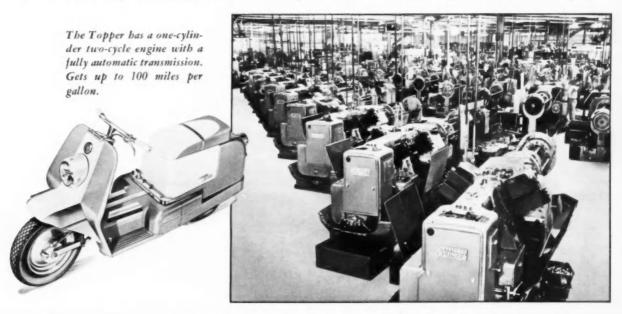
This part is machined on a standard 2"-6 Air-Feed Bar Automatic at a gross production rate of 53 pieces per hour with High Speed Steel tools. It is machined from 13/16 inch round stress-proof steel at a spindle speed of 517 rpm, producing 112 sfm on the outside diameter of the stock. A 2-7/8 inch tool slide is used with a .0051 inch feed on the endworking tools.

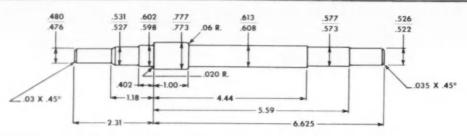
The part is fed out 9-1/8 inches in the first position against a live-center receding stock-stop. When the stock contacts the stock-stop the collet closes and the stock-stop

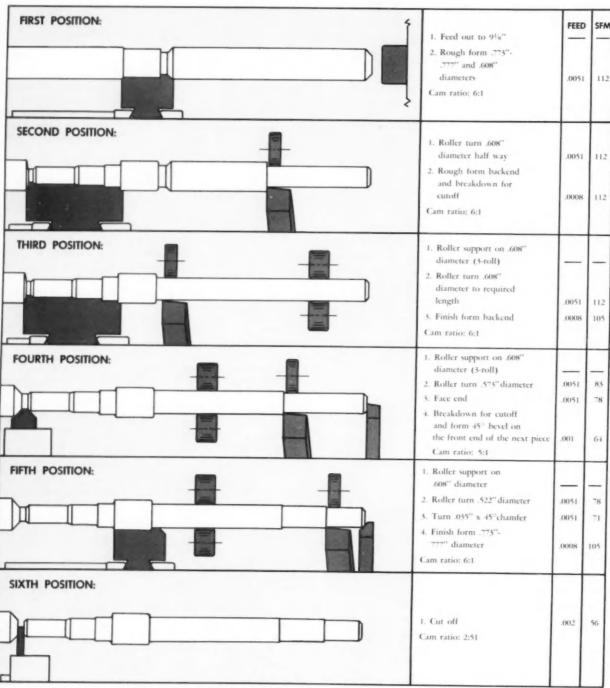
moves away from the end of the bar, permitting the stock to rotate freely and index to the next position. The movement of the stock-stop is controlled by a small air cylinder mounted on the gear box. After the stock is fed out the .773-.777 inch diameter and a small section of the .608 inch diameter is formed.

The .608 inch diameter is roller turned halfway and the backend of the part is rough formed in the second position. A three roll roller rest mounted on the tool slide in the third position supports the work piece while the remainder of the .608 inch diameter is roller turned and the backend is finish formed by a standard dovetail form tool.

In the fourth position the .573 inch diameter is roller turned and the end faced with an auxiliary turner. A flat form tool breaks down for cut-off and forms a 45° bevel on the front end of the next piece. The purpose of this bevel is to provide a better starting condition for the roller turner in the second position. The .522 inch diameter is turned with a standard roller turner and chamfered by an auxiliary turner and the .773-.777 inch diameter is finish formed in the fifth position. The machining operations in the fourth and fifth positions are supported by standard three roll roller rests. The part is cut off in the sixth position.







If you wish to receive AUTOMATIC NEWS regularly, write Greenlee Bros. & Co., Rockford, III.

NEWS

FEATURES

Air-Car Production

Curtiss-Wright announced it will begin production in November of the Air-Car, a vehicle that travels on a cushion of compressed air.

The 300-hp vehicle carries four passengers and travels over water, swamp, or any unobstructed terrain 6 to 12 in. off the ground, the company says. It has no wheels, transmission, or clutches.

The Air-Car is 21 ft long, 8 ft wide, and weighs 1700 lb. It can be operated by anyone who can drive a car, and will cost no more than conventional automobiles, according to C-W. Prototypes of an "Air-Bus" and "Air-Truck" are now in process.

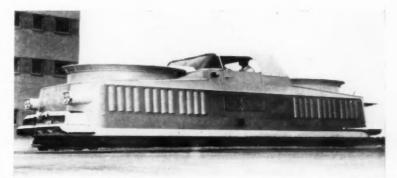
Cadillac Chief Sees Sales Increase

The "open season" for predictions is at hand.

With the 1960 car year about to get underway, James M. Roche, Cadillac general manager and GM vice-president, takes aim with the first official forecast. His estimate for 1960: 6.9 million sales, including 6.4 million domestic cars and half a million imports.

Cadillac expects to share in the market increase, says Roche. For calendar 1959, Cadillac will end up with production of 154,400 cars. Next year, however, Roche anticipates capacity production of 156,000 units.

Roche made his predictions when Cadillac unveiled its 1960 models at a press preview recently in Detroit,



Prototype of the Air-Car, which will be manufactured by Curtiss-Wright Corp. at its South Bend Div. starting in November.

Production of 1960 models is slated to begin Sept. 8 with public introduction Oct. 2.

Roche said that 1959 model production totaled 142,272 cars, a 17 per cent increase over 1958 and third best model year in the division's history. This was accomplished in a 10-month year that was cut short by a month-long strike at Cadillac. He added that retail deliveries during the first seven months of 1959 were highest in history—88,404 Cadillacs.

Roche based his optimism on the strength of the nation's economy, underscored by an 11 per cent increase this year in gross national product, a seven per cent hike in personal income, a five per cent rise in bank deposits, and a four per cent increase in employment over last year.

Roche's 1960 forecast also may reflect Detroit thinking on the effect the Big Three small cars will have on imports. In explaining his prediction of a drop of 100,000 in foreign car sales in the U.S., Roche said, "I think the foreign cars will get some competition now."

Asked about steel supplies, Roche said only that Cadillac has enough on hand to sample the dealer organization with new models.

New AC Space Lab

AC Spark Plug Div. of General Motors is building a new 30,000 sq ft space laboratory at Wakefield, Mass., for advanced missile guidance development. AC general manager Joseph A. Anderson says the new facility will concentrate on development of electro-mechanical components and sub-systems for missiles. Special emphasis will be placed on inertial platforms, gyroscopes and accelerometers, according to Anderson.

The new facility will be directed by Fred Best of Boston, with Donald J. Atwood, another Bostonian, associate director.

TABLOID

Yttrium shows high promise as an alloying agent, according to Soviet metallurgists. They report that 0.1 to 0.2 per cent yttrium reduces grain size of many cast metals and improves strength. Other characteristics cited: dissolves completely in cerium; interacts with aluminum, iron, and copper to form eutectic mixtures; barely dissolves when alloyed with chromium, titanium, and zirconium; and is virtually immiscible with vanadium, niobium, tantalum, and molybdenum.

A new method of putting an extremely hard case on aircraft structures and other nitrided steel components is undergoing final tests in the A. F. Holden Co. laboratories. The process, called "liquid pressure nitriding," takes from 8 to 16 hours less time than conventional dry or retort nitriding, says Holden. Other advantages claimed: distortion is held to a minimum, and the "white" layer left by spent ammonia gases is eliminated.

Lockheed engineers have developed a quick-freeze box that cuts the time needed to warp-proof parts for Lockheed airliners. The new 337-cu ft freezer—said to be the largest of its kind ever built—subjects anti-icing ducts to a 200 F temperature change in just two minutes, Lockheed says.

A new "one shot" process for molding polyurethane foam that eliminates the need for cutting the material has been announced by National Aniline Div. of Allied Chemical Corp. Parts are made in a single operation by foaming the liquid ingredients directly in the mold, with special foaming agents providing the low density needed for cushioning comfort. Besides such obvious applications as automobile topper pads, arm rests, and fully molded seats, the company expects usage as a filler material in tires.

A radio warning device can be set up to broadcast a blanket 50 to 100 ft wide and up to 2000 ft along a highway, says Delco Radio Div. of General Motors. Messages from the device, called Hy-Com, could be picked up by small portable receivers rented for toll road travel or on car radios adapted for broadcasts on the very low frequency radio band.

Minneapolis-Honeywell has a thermal simulator that "impersonates" an atomic power plant when it's hooked up to another Honeywell device that simulates a nuclear reactor. Developed primarily as a training aid by the Industrial Products Group, the simulator also can be used to make design studies of projected nuclear power plants.

. . .

Soviet engineers are using a rocket-propelled tunnel digger to lay underground canals and pipes, according to the Hungarian magazine Magyar Nemzet. Flames from a pulverizing device in the front of the digger, which contains a mixture of liquid fuel and compressed air, blast a path for the rocket, leaving a cylindrical tunnel behind.

Armour Research Foundation of Illinois Institute of Technology reports it has come up with a more reliable radar beacon system for controlling missiles in flight. The new system, according to ARF, uses three- or four-pulse signals which cannot be generated by radio interference in the radar beacon receiver in multiple radar setups.

Gilbert Plastics, Inc., one of the leading makers of plastic packaging for automotive components, is building a 40,000-sq ft addition to its Kenilworth, N. J. plant. Slated for completion in early 1960, the new facility will be equipped with a highly automated battery of injection molding machinery for turning out rigid, full-visibility boxes.

Chrysler Valiant

Chrysler Corp. has assigned basic marketing responsibility for Valiant to the Plymouth-De Soto Div. and tacked the Valiant name on the end of the division's identification.

Corporation executive vice-president William C. Newberg says that market studies show that Valiant dealers should be picked on the basis of dealer location and market potential. GM and Ford, unlike Chrysler, are assigning their new products exclusively to Chevrolet and Ford car dealers.

Although Plymouth and De Soto dealers will get a crack at selling the Valiant, the 106-in. wheelbase car will be built at the former Dodge Main plant, now known as the Hamtramck Assembly Plant, alongside the standard Dodge and Dart lines.

BMC Sales Up

British Motor Corp. sold 34,087 cars in the first seven months of this year, compared with 17,711 in the like period last year and 33,109 for all of 1958.

In the last week of July, sales hit 1586 cars, according to Hambro Automotive Corp., BMC's representative in the U. S. Dollar volume this year amounts to nearly \$70 million.

Body Engineers Plan

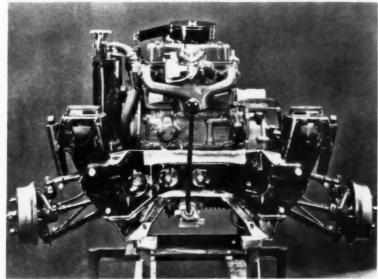
The new small car will be featured in technical papers presented at the 14th annual convention of the American Society of Body Engineers Oct. 21-23 in Detroit. Will Scott, director of product planning at Ford Div., will discuss "Planning the Light Car," and Chrysler's William Braathen will speak on "Styling Requirements for the Light Car." Other papers will include die-less forming of metals, linear polyethylene applied to seat side shields, passenger location of aluminum body application.

NEWS

FEATURES

CONTINUED





Morris Mini-Minor is only 10-ft long, but 10-in. wheels placed at corners of the body makes possible seating for four people. Rear view (bottom) of front sub-frame, shows cross-mounted engine combined with underslung gearbox, which acts as the oil sump. Rubber cone springs are supported by vertical extensions of the frame.

B.M.C. Cars Feature Front-Drive with Transverse Engine

British Motor Corp. has made a mass assault on the ultra-small-car market with its Morris Mini-Minor and Austin Seven.

Both cars are nearly identical and feature rubber suspension and front-drive with transverse engine. They are built on duplicate lines at Longbridge, Birmingham, and Cowley, Oxford. The front-drive assembly is a compact unit with the 51.79-cu in. engine mounted transversely on a sub-frame. Gearbox and differential are carried below. The gearbox is bolted directly to the engine in place of the oil pan and acts as a sump; the differential housing is attached to the side of the transmission case.

The four-cylinder ohv engine develops 34 bhp at 5500 rpm and has a single carburetor fed from the fuel tank in the rear by an electric pump. It drives through a four-speed gearbox synchronized on the top three ratios. Torque is transmitted through universal jointed shafts.

Front Suspension

Springing medium for each front wheel is an inverted rubber cone coupled to the upper support arm through a tapered thrust bar and a nylon bushing placed close to the pivot of the suspension member. The small cups, supported by a vertical extension of the sub-frame, need no greasing, are silent in operation, and have negligible effect on unsprung weight.

Steering knuckles are linked to the suspension arms by ball joints, and the rack-and-pinion steering gear is fixed to the toe-board of the body shell.

The rear suspension assembly consists of a second sub-frame with independent trailing arms sprung by similar rubber cones. These are positioned horizontally on each side of the frame, with the compression bars joined to the arms near their rotational axis by the same type of nylon bushing. Telescopic shock absorbers are used on all wheels.

Brake System

Brakes use 7-in. drums with leading and trailing shoes. Hydraulic pressure to the rear brakes is limited by an automatic cut-off valve. This transfers full braking power to the front wheels at a point near maximum pedal pressure, thus avoiding locking the rear wheels. The system is the same as that for the Austin A99 (A.I. August 1, 1959).

The two-door body is of integral construction, and seats four people well between the axles despite an overall length of only 10 ft. To gain space small, 10-in. wheels are placed at virtually the corners of the car. Spare wheel, battery and 6.6-gallon gas tank are carried in the trunk, which provides 5%-ft of luggage space.

Both cars are 4 ft 7 in, wide, 4 ft 5 in, high and weigh 1288 lb.

Price Hike Predicted

Detroit sources are predicting a general price increase of between two and two and one-half per cent on 1960 model cars. Although prices usually are not determined until the 11th hour, present thinking is that economic factors will force an increase on the industry.

One automobile company source indicated every effort is being made to "hold the line," but there seemed little hope of maintaining current prices.

Cadillae's general manager James M. Roche attributes part of his division's success during the 1959 model year to the fact that Cadillac held prices at 1958 levels. For the '59 year, two models were reduced, three "limited volume" models were increased slightly, and the rest of the Cadillac line remained unchanged.

But since the '58 prices were established, Roche emphasizes. Cadillac has seen a 4.5 increase in aluminum prices, more than 8 per cent rise in wage rates, 3 per cent boost in steel prices and a 10 per cent hike in zinc prices.

CHINESE CAR FEATURES AMERICAN STYLING



Dual headlights, wraparound windshield and other Detroit-inspired styling touches are featured on the Shanghai built Phoenix, latest in a run of prototype cars now emerging from factories in Communist China (AI, March 1, 1959). A V-8 engine of undisclosed capacity is said to provide a top speed of 120 mph. The heavy eight passenger limousine is equipped with power steering and brakes. The underslung unit beneath the grille is a supplementary radiator for oil cooling.

Outcome of current steel negotiations could have an adverse effect on automobile pricing, although it is doubtful that the steel settlement will be reached before 1960 cars are introduced. Two things could happen. Either the car manufacturers will anticipate the outcome of the steel talks, and the inevitable boost in steel prices, or they will price new models according to current steel prices and

then consider the possibility of a further price hike later on.

The three new entries on the U.S. market, often referred to as "economy" cars, will have something to advertise. Corvair, Valiant and Falcon each will have "at least one model" below \$2000—probably \$1945-\$1995. But with the more deluxe models—and with options—prices will go as high as \$2600 for the small cars.

NEWS

FEATURES

CONTINUED

Chrysler Engines

Chrysler Corp. is working with the Army on two engine development programs announced recently. One, a \$1.1 million contract with the Detroit Ordnance District, covers research and development of a multi-fuel compression ignition V-8 engine. This lightweight, high-speed engine will be designed for mass production for the Armed Forces.

The other R&D contract, also with the Detroit Ordnance District.

calls for testing Chrysler's latest experimental gas turbine engine installed in a 14,000 lb gvw Dodge truck.

During the coming year, Chrysler's Engineering Div. research section will conduct proving grounds and public highway tests with the turbine vehicle. The Army will cooperate with —65 F cold room starting tests at the Detroit Arsenal.

The contract also calls for fuel economy checks using various fuels.

Kaiser Milestone

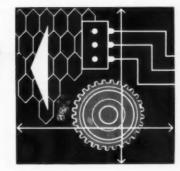
Industrias Kaiser Argentina has manufactured its 50,000th vehicle, a two-wheel drive Jeep. Production began April, 1956, at the Cordoba plant, and last year totaled one per cent of Argentina's gross national product. IKA currently is tooling to produce a small passenger car at Cordoba.

Ford Canada Sales

Ford of Canada recorded sales of \$275 million during the first half of 1959, with net income of \$15.3 million. Last year, six-month sales were \$243 million and profit was \$10.2 million. Unit sales increased 8.7 per cent to 107,597.

AVIATION

MANUFACTURING



Military Spending

Military spenders are drawing up their shopping lists, deciding how they will invest more than \$39.2 billion in new funds.

In the antimissile defense field, the Army has new financial encouragement. It can draw on \$137 million in extra funds to step up the development of its Nike-Zeus antimissile missile.

The Navy antisubmarine warfare program also is bolstered by an additional \$137 million. These funds include \$45 million specifically labelled for research, to help the Navy probe for breakthroughs in detection and destruction methods. Also contained in the \$137 million is money for another atomic-powered submarine.

Procurement for the Atlas intercontinental missile project can be carried out at a faster pace. Congress put into the Air Force budget enough money for the initial buying needed for 17 squadrons. Only nine squadrons, of ten missiles each, had been proposed by the Air Force. The extra funds, \$172 million, also are to cover development of the solid-propellant Minuteman ICBM at an increased rate.

An Air Force analysis of some major portions of its requested and approved procurement budget shows the following (figures in thousands of dollars):

Buying Category	Requested	Approved
Aircraft	\$4,409,100	\$4,284,600
Missiles	2,601,200	2,540,600
Other procurement	1,165,200	1,109,700
R & D	1,149,900	1,159,900

Tactical missile procurement by the Air Force appears to be slated for a drop. The service asked for \$127 million to buy the Mace, a follow-on to the Matador. Congress approved no funds, but made this provision: If the Air Force can dig up the money from other programs, it can buy the Mace—if the Defense Secretary labels it "essential."

No money is put into the new budget for the buying of commercial-type jet transports, which the Air Force had sought.

In the approved Navy budget, \$35 million is provided for the buying of long-lead-time items for another atom-powered aircraft carrier. Total cost of the carrier is estimated at \$380 million, but there is some feeling in Congress that the final cost will be higher.

Tantalum Study Award

National Research Corp. has received a Navy contract to develop tantalum and tantalum-tungsten metal alloys for use in solid fuel rocket propulsion systems.

The contract is aimed at developing missile parts capable of operating at the extreme temperatures generated by solid fuel systems. One promising alloy already tested by National Research has a tensile strength three times greater than that of tantalum at 4000 F, the company said.

Under terms of the contract, the company will also study the use of various forms of carbide coatings as a means of improving the temperature and erosion resistance of these alloys.

Metals Research Center

Du Pont Co, announced it will build a metallurgical research center at its Baltimore facility to speed development of high-temperature metals for jet engines, rockets and missiles, atomic power generators, and other hardware of advanced design.

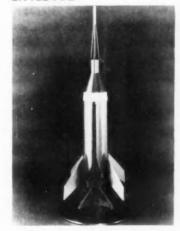
The new installation slated for completion by the fall of 1960, will contain equipment to forge, extrude, roll, draw, and heat treat such refractory metals as niobium, tantalum, titanium, zirconium, tungsten, and chromium.

From these refractory materials, the new facility will be able to produce a full range of mill products—ingots, tubes, rod, sheet, strip, and foil—for sales development programs, Du Pont said.

SAE Aero Meeting

The SAE National Aeronautic Meeting, to be held Oct. 5-10 in Los Angeles, will feature panel discussions and technical papers on subjects ranging from missile ground support equipment to high temperature materials, aircraft and missile structure and jet transport performance.

LITTLE JOE

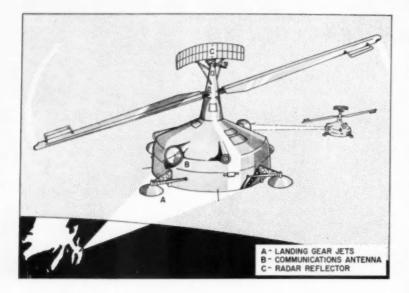


Configuration of little Joe capsule launching rockets is shown in this first photo of a scale model of the space vehicle. North American Aviation's Missile Div. is building the rocket launcher and boosters for an early phase of the National Aeronautics and Space Administration manned satellite program.

AVIATION

MANUFACTURING

CONTINUED



Raytheon Gets Study Contract for Sky Platform

The Air Force awarded Raytheon Co. a \$90,000 study contract for its proposed unmanned flying platforms that would be used for early warning radar and long-range communications (AI, May 15, 1959).

The platform would be kept aloft indefinitely with power supplied by microwave energy beamed up to it in narrow paths by powerful ground transmitters.

Microwave power would be provided by Raytheon's Amplitron tubes and picked up by the platform's antennas and converted into heat energy. This energy in turn would be converted into tip jet propulsive power through a gas turbine engine and compressor.

For initial take off and climb to altitude, the Raytheon platform would use a small gas turbine powered by conventional fuel.

New Cooling Techniques

New techniques for cooling Raytheon's Amplitron microwave amplifier tube have opened the way to development of tubes with enough power output to meet the requirements of the sky platform concept, the company explained.

Raytheon is now producing Amplitron tubes with an output of 20 hp at 3000 mc frequency and states that 100 hp tubes will be available within two years. Eventually, the company expects to produce tubes that can deliver 500 hp.

Microwave power would be generated in a ground station by a battery of Amplitrons and beamed to sky platforms by antennas grouped in a 400-ft sq array. Like a battery of searchlights, the beams would be aimed to focus at the platform in a circular spot less than 100 ft in diameter.

1000 Rotor Hp Needed

Raytheon studies indicate that about 1000 rotor horsepower would be needed to keep the sky platform aloft. To develop this power, about 10,000 hp of microwave energy would be needed on the ground, based on an overall system efficiency (generator microwave power to rotor power) of 9.6 per cent. To produce this power, an electrical generator with a 20,000 hp output would be needed.

AF Cancels J93-5 Pact

Conventional fuels, not highenergy liquid metal compounds, are to be used in the new 2,000-mileper-hour Air Force B-70 bomber.

A special jet engine, the J93-5, was to have burned the so-called "exotic" fuels in powering the intercontinental bomber. But the Air Force now cancels its J93-5 contract with General Electric Co. Air Force spending on development of the engine amounted to \$10 million.

Brought to a halt at the same time is the scheduled operation of a high-energy boron fuel plant at Model City, N. Y. The plant, to have been run by Olin Mathieson Chemical Corp., had required the spending of \$45 million.

A boron fuel contract with the Navy, held by Callery Chemical Co., also is erased. The Navy cancels its agreement with Callery for production of the fuel at a \$35-million plant at Muskogee, Okla. Future use of the plant is still in doubt.

Despite cancellation of the J93-5 contract, the Air Force says it is going ahead with its plans to build the B-70. Usefulness of the bomber has been questioned, in view of anticipated progress in the intercontinental missile projects. However, Gen. T. D. White, USAF chief of staff, has told Congress he believes it will be many years before the missile can do everything a manned bomber can do.

The Air Force intends to use the J93-3 engine in the B-70. This same engine, which burns conventional fuels, is to power the F-108 long-range fighter. North American Aviation, Inc., is the prime contractor for both the B-70 and the F-108.

Space Research Center

American Metal Products Co. is building a modern research and development center at Ann Arbor, Mich. The new facility, slated to begin operations in December, will expand the company's program in the nuclear applications, missiles, and space vehicles. It will be operated by AMP's Engineering and Science Div.

Ducted-Fan Engine

Bristol Siddeley will display its B 58 ducted-fan engine for the first time at this year's Farnborough Air Show.

The B 58, a high-thrust light-weight engine, can be used in both commercial and military applications, the company says. Advantages claimed: reduced fuel consumption and noise levels, more power for cruising, shorter take-offs.

The ducted-fan engine is basically a turbojet with a fan installed on either the front or the rear of the engine. The fan, driven by an extra set of turbines, is enclosed in an open-ended casing. The tips of the fan blades, extending into the airstream surrounding the engine, act like propeller blades to provide extra thrust. The mass of cold high-energy air generated by the blade action also can be used for boundary layer control, flap blowing and thrust reversal, direct lift, and other functions.

The ducted fan's main advantage -fuel economy-derives from the principle that an engine reaches its maximum propulsive efficiency when the velocity of air it moves matches the speed of the aircraft. Thus the high-velocity exhaust of supersonic planes is efficient at high speeds, but wastes fuel at low speeds. At subsonic speeds, the ducted-fan engine, moving larger volumes of air at lower velocities, is much more efficient than the turbojet, especially at cruise and takeoff.

Shoulder-Fired Missile

The Army has awarded Convair Div. of General Dynamics Corp. a \$6-million contract to develop a new anti-aircraft guided missile for ground troops.

The new missile, called Red-Eye, looks like a bazooka and is intended to be fired from the shoulder against low-flying planes. The weapons system is about 4 ft long, 3 in. in diameter, and weighs about 20 lb.

The launcher tube houses a composite missile structure that includes propellant, electronic guidance, and high-explosive warhead. The tube also doubles as a ship-

FAIREY ROTODYNE USED AS FLYING CRANE



Fairey Rotodyne VTOL plane demonstrated its versatility by carrying a 103-ft long bridge section 3 miles and setting it down to span a river. The bridge section was fitted with removable wooden fins that stabilized the load and prevented yawing at high forward speeds. Production version of the Fairey Rotodyne will be powered by Rolls-Royce Tyne engines and be capable of carrying loads of over 20,000 lb at speeds up to 200 mph.

ping container when capped at both ends.

Development work on the new missile will be done at a facility operated at Pomona Calif. by Convair.

Titan Nose Cone

AVCO Corp. has received an Air Force contract totaling \$73,360,000 for development of an advanced design nose cone for the Titan ICBM.

The award follows an earlier letter contract under which AVCO was authorized to begin work on the new nose cone.

The contract calls for a new aerodynamic design that will permit faster re-entry of the nose cone. It also includes development of new high-temperature materials as well as improving the reliability of sub-systems.

4-Place Business Plane

Beech Aircraft Corp. announced it will add a new four-place, single engine model to its executive airplane line for 1960.

The plane, designated Beechcraft

Model 33, will be similar in configuration to the Beechcraft Bonanza, but will have a conventional tail and a sweptback stabilizer. Its gross weight will be less than the Bonanza; its engine rated at less horsepower.

Price of the Model 33 will be around \$20,000.

Weather Study Award

Borg-Warner Corp. received a contract from the Federal Aviation Agency to study the type and amount of weather data needed to meet the requirements of jet air travel through 1975.

The contract, awarded to Borg-Warner over the competitive bids of 15 other firms, will total about \$600,000, the company said. Eugene Bollay, research director in Meteorology Instrumentation for the BJ Electronic Div., will head the study.

Borg-Warner said that data for the survey will be collected from more than 140 installations. These will include commercial air carriers, Army, Navy, and Air Force Commands, and general aviation organizations.

IN THE NEWS



Aetna Ball & Roller Bearing Co. — J. J. Rozner has been elected president.



Midland-Ross Corp.

—W. C. MacFarlane,
Jr., vice-president and
general manager of
Detroit Div., takes on
the additional post of
general manager of
Cleveland Div.



Baldwin-Lima-Hamilton Corp., Loewy-Hydropress Div. — F. A. Fielder was elected vice-president and general manager.



Buick Motor Div., General Motors Corp. —J. R. Gretzinger was named director of reliability and quality control.



Dow Chemical Co.

—D. Chapin was promoted to assistant to the manager, Detroit office.





Armstrong Cork Co.—R. B. Rohrer has been named associate director of research for the Research and Development Center.

Allis-Chalmers Mfg. Co. — V. M. Holloway was appointed general sales manager of Construction Machinery Div., and R. R. Walker sales manager of Defense Products Div.

Lindberg Engineering Co.—J. R. Corey was named administrative assistant to the general manager, Western Div., Los Angeles Plant.

Bendix Aviation Corp.—L. B. Musser has become Atlantic regional manager for the Industrial Controls Section.

Firestone Tire & Rubber Co.— J. L. Cummin is now manager of the eastern sales division.

American Motors Corp. — J. F. Adamson was made chief engineer of Wisconsin automotive operations.

Miniature Precision Bearings, Inc.

R. I. Kern was named vice-president, marketing.

Joseph T. Ryerson & Son, Inc.— G. H. Blank was made sales manager at Buffalo, N. Y.

Standard Tube Co.—P. J. Selinger was appointed manager of product development.

Volkswagen of America, Inc. — A. W. Outcalt has been named sales promotion manager.

Electric Auto-Lite Co.—F. E. Kruse was made staff assistant to the director of engineering, Electrical Products Group.

Linde Co., Div. of Union Carbide Corp.—J. E. Dato was named sales manager, electric welding.

Continental-Emsco Co.—J. R. Bechtold and L. Drake were appointed assistants to the vice-president, special projects and services.

Atlas Supply Co.—I. W. Folk has been promoted to manager of the Atlas laboratory.

Chevrolet Motor Div., General Motors Corp.—C. Jakust was named assistant chief engineer in charge of all passenger car body design and H. H. Schroeder director of car body research and developClark Equipment Co., Industrial Truck Div.—P. E. Campbell has been appointed manager of transportation sales.

E. W. Bliss Co., Mackintosh-Hemphill Div.—P. H. Fratangelo has become chief engineer.

LeTourneau-Westinghouse Co. — D. K. Heiple was named manager of the Sales Development Dept. and J. E. Sheets eastern sales manager.

Oliver Corp.—I. S. Boulton has been made director of purchases.

Minneapolis-Honeywell Regulator Co., Industrial Products Group — Robert A. Wolfe was named sales manager at Pittsburgh; E. J. Reulbach, Jr., sales manager at Albany; and J. H. Toifel, sales manager at Columbus. O.

Consolidated Electrodynamics Corp.

-F. H. Donnell was elected senior vice-president, finance.

Eaton Mfg. Co., Saginaw Div.— L. R. Gartung was made chief industrial engineer.

Esso Standard Oil Co. — R. O. Goodykoontz and J. P. Warner have been elected vice-presidents.

ACF Industries, Inc., Carter Carburetor Div.—G. A. Goddard has been appointed Detroit manager of service sales.

Dayton Rubber Co.—A. W. Cox is now director of urethane product sales.

Necrology

S. R. Doner, technical representative of Manhattan Rubber Div., Raybestos-Manhattan, Inc., died Aug. 12, at Boonton, N. J.

A. Kauffmann, 79, a former president of Link-Belt Co., died Aug. 7, at Chicago, Ill.

F. R. Kohnsramm, 62, president of Jack & Heintz, Inc., died Aug. 7, at Shaker Heights, O.

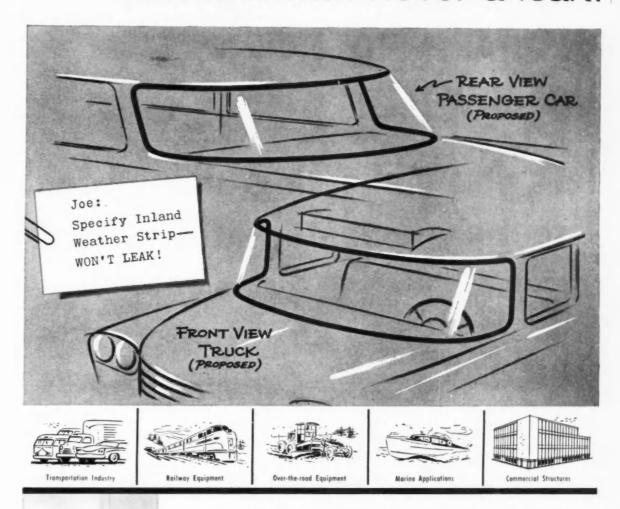
R. T. Todd, 69, consulting engineer for McKay Machine Co., died Aug. 6.

Y. C. Cline, 61, vice-president of Arvin Industries, Inc., died Aug. 2, at Columbus, Ind.

A. F. Wall, 68, board chairman of Wall Colmonoy Corp., died Aug. 3, at Detroit, Mich.

C. E. Stutz, 76, who helped design and produce the Stutz Bearcat sports car, died recently, at Miami, Fla.

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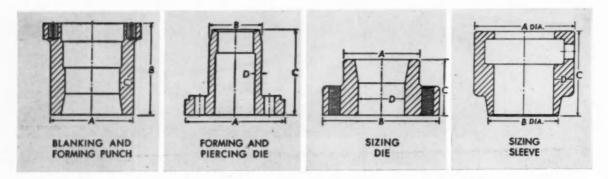
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Inland Manufacturing Division, General Motors Corporation, Dayton, Ohio

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Increasing Productivity

VEN WITH THE BUSY SEASON of new model announcements just ahead, the automo-I tive industries are undertaking additional efforts to increase productivity at the same time that they prepare to demonstrate new style, convenience, utility and economy in automotive products for consumers. The advances in the products are being backed up by advances in production engineering in the plants. While many important and significant improvements in production have just been made, and technical articles in future issues of this magazine will present such steps in detail, the long range problem of maintaining a steady pace of further production technical progress will remain an active project in every automotive manufacturing department.

IN THIS ISSUE, the Executive Vice-President of one of America's major industrial associations personally presents the automotive industries with a suggestion for group cooperation to help solve problems of this type. To the best of our recollection, this is the first time that such an important suggestion has been made. The publication of this virtual invitation to the automotive industries to take advantage of the "open door" of the Machine Tool Industry organization, could be the first step in a program of joint activities which could go far to create a sustained trend of increased productivity. This would certainly be a most desirable goal for both the automotive manufacturers as well as the machine tool builders.

THERE ARE BROAD AREAS OF COMMON INTEREST which can serve to bring these industries closer together. Domestic affairs such as inflation, cooperation on National defense activities, reduction of waste and idle time in the plants, and improvement of depreciation allowance policies of the Federal Government are typical areas where exchange of ideas and recommendations can be effective. Gains in productivity could be one of many benefits resulting from effective cooperation.

THERE IS ALSO A FIELD of important potential for expanded cooperation in the improvement of all aspects of applying automation, mechanized production and engineering planning. Today



an Editorial

many options exist for choosing alternative kinds of processes which did not exist in former years. Within the automotive industries, more production and design engineers need to know more about such opportunities than ever before. The research in such functions is not only greater than formerly, but it is also moving ahead at a more rapid pace than formerly. Therefore the total task of communications of technical information is more important than ever.

These Advances Which Profoundly Affect the potentials for future gains in manufacturing methods, as well as product improvements, are communicated to executives in top management, in financial management, in cost accounting and in other major departments of automotive industries, as well as to production and design engineers. The cooperation of the machine tool industry could be helpful in these activities, as well as in serving the practical problems of manufacturing managements and engineers.

THE AUTOMOTIVE INDUSTRIES HAVE ALWAYS been responsive to the opportunities for cooperation which have been offered by other industries. Past decades have seen many examples of such close cooperation with manufacturers of chemicals, safety devices, fuel additives and petroleum products, rubber products and a wide range of others. Such precedents resulted in substantial benefits for both the automotive industries and the cooperating fields. It can be expected therefore, that closer cooperation of the automotive industries with the machine tool builders will bring about substantial and worthwhile gains for all concerned. If increased productivity is the most important gain, the machine tool industry will have contributed significantly to the solution of one of the most important long range problems of automotive industries' production. We hope that Mr. Ludlow King's suggestion will be given top level consideration in every manufacturing organization in the automotive field.

Hortey W Barcley

Editor

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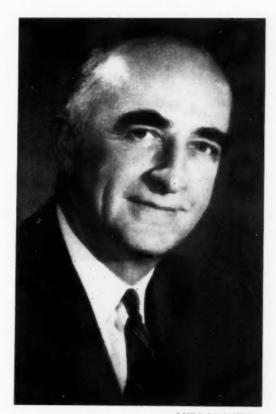
FRAM CORPORATION, Providence 16, R.I.



PROGRAM FOR PRODUCTION U.S.A.



By Ludlow King



LUDLOW KING

Executive Vice President NATIONAL MACHINE TOOL BUILDERS' ASSOCIATION

"The Machine Tool Industry is more alert than ever before to customer problems."

"When a problem in one industry involves a problem in another industry, the logical thing to do is to get representatives of both industries together on a group basis."

THE relationship between the machine tool industry and the automotive and aircraft industries is a remarkable example of inter-dependence.

The aircraft and automotive industries represent two of the largest markets for machine tools; and without machine tools, these industries could not exist.

These basic facts provide a firm foundation for continuous consultation and cooperation.

There has always been collaboration between machine tool engineers and automotive and aircraft engineers. The solution of many vital production problems had, of necessity, to be a joint solution.

The objective of such collaboration has likewise been a mutual one. The end result that was sought was increased productivity, with closer quality control at lower unit cost. This is the economic function of machine tools. In the machine tool industry, product design and improvement center upon cost reduction for the customer.

(Continued on next page)

"My purpose here is to stress the part that cooperation between related industries, through their trade associations, can play in further advancing and cementing joint efforts on behalf of mutual objectives."

TODAY, cost reduction is the great challenge to the U. S. A. In view of the current situation with respect to wages, taxes, and material costs, the main remaining avenue to cost reduction is improvement in productivity.

In this field, too, the automobile industry and the machine tool industry have a common problem. In machine tools, as in automobiles, foreign builders with low wage rates are now invading the domestic market. This is therefore still another area of mutual interest.

Traditionally, over the years, executives of individual machine tool companies and individual automotive and aircraft companies have gotten together to discuss machine design and production problems, and other subjects of concern to both. That, of course, is as it should be. But my purpose here is to stress the part that cooperation between related industries, through their trade associations, can play in further advancing and cementing joint efforts on behalf of mutual objectives.

Trade associations function most effectively through committees, which are generally composed of the top brains of their industries. Now I will admit that committee action is sometimes slow and cum-

bersome; but it has nevertheless an advantage that cannot be obtained any other way—the advantage of getting the points of view of all of the various parties concerned.

When a problem in one industry involves a problem in another industry, the logical thing to do is to get representatives of both industries together on a group basis. Trade associations provide the medium for such procedure.

Let me give you some examples of such cooperation between the machine tool industry and the aircraft and automobile industries.

Our Association has a Committee on Electrical Standards. For over 10 years, now, members of this committee have met regularly with members of the automobile industry to discuss J. I. C. electrical standards for that industry. Points of view have been freely expressed on both sides, there has been disagreement on some subjects; but the important thing is that on a number of matters there has been agreement, and the outcome has been the adoption of specific standards for various purposes. This is an activity which presumably will continue regularly, and progress will continue to be made.

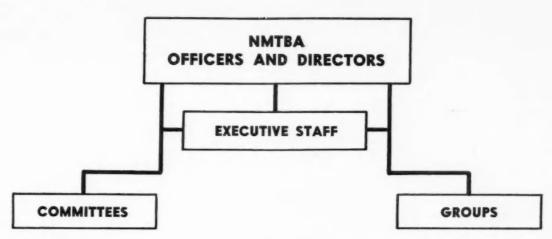
NMTBA's 1958-9 ELECTRICAL STANDARDS COMMITTEE

Seated from left to right are: E. J. Loeffler, chief control engineer, The Warner & Swasey Co.; Meyer Fox, chief electrical engineer, The LaPointe Machine Tool Co.; Nelson P. Bashor (chairman), director of electrical controls div., W. F. & John Barnes Co.; Jack Greening (guest); Jack North, electrical engineer, Micromatic Hone Corp.

Standing—left to right: Joseph I. Ehrhardt, supervisor of electrical engineering div., Ex-Cell-O Corp.; Reeve W. Dean, assistant to president, Niagara Machine & Tool Works; Leland S. Inscho, electrical engineer, Pratt & Whitney Co., Inc.; N. A. Anderson, chief electrical engineer, Grinding Machine Div., Norfon Co.; Richard R. Schmitz, chief electrical engineer, Giddings & Lewis Machine Tool Co.; Kenneth F. Smith, electrical engineer, The Feate-Burt Co.

(Committee member not present— Albert E. Good, electrical engineer, Elmes and King Div., American Steel Foundries)





Government Relations

Taxation and Renegotiation

Foreign Trade

Permanent Defense Capacity and Procurement

Machine Tool Exposition—1960

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Advertising & Market Research

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Numerical Controls

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Training

Electrical Standards

Metalurgical Problems

Technical Standards

Hydraulic Standards

NMTBA Industry Committees and Groups

SEE NEXT PAGE FOR PERSONNEL

Our Association has a Numerical Controls Committee. Representatives of this committee have been meeting with three numerical control committees of the Electronic Industries Association—namely, the committees on Construction Standards, Numerical Machine Tool Control, and Storage Media. Representatives of the aircraft and automobile industries also attend such meetings. Thus there is provided an opportunity for interchange of ideas.

The Airframe Manufacturing Equipment Committee of the Aerospace Industries Association has a Subcommittee on Numerical Control, and a representative of our Association sits in on the discussions of that committee.

A few years ago the question of

J. I. C. Press Room Standards came up between automobile manufacturers and the press builders, who are a segment of the machine tool industry. The result was a series of meetings between representatives of both groups, which continued through 1955, 1956, and 1957. The outcome was a whole new series of Press Room Standards for the automotive industry.

The automobile industry has been investigating the "buildingblock" idea for transfer machines. Ford, Chrysler, General Motors, and International Harvester were the leading exponents of this concept.

The automobile industry contacted 26 machine tool building companies as to the possibility of the standardization of components

Automatic Bar Machine
Automatic Die & Tap
Automatic Lathe & Turret Lathe
Broaching Machine
Cylindrical and Universal
Grinding Machine
Gear Equipment
Heavy-Duty Upright Drilling Machine
Horizontal Boring Machine
Hydraulic Press
Lathe

Mechanical Metal Forming Metal Sawing Machine

Milling Machine

Open Back Inclinable Press

Planer & Planer Type Milling Machine

Radial Drilling Machine

Sensitive Vertical Drilling Machine

Shaper

Special Way Type and Transfer Machine

Surface & Internal and Tool & Cutter Grinding Machine

Threading Machine

Vertical Boring Machine

of transfer, dial type, and multiplestation machines. The machine tool builders were asked to provide engineering data and statistics.

The automobile people, after studying this information, developed proposed average standards, and asked for group meetings to discuss them. Four meetings were held which were attended by machine tool builders. There was a free expression of opinion all around as to what should or should not be done.

The result was that the extent of standardization contemplated was reduced to the mounting dimensions of the "building blocks." The underlying principle was that standardization should not be carried to such an extent as to interfere with originality and improvement of machine tool design.

As the outcome of these meetings, a revised set of proposed standards has now been submitted by the automobile companies and, as of today, is under consideration.

This is a typical example of how progress can be achieved by group discussions which results in a meeting of the minds. While, as it happened, this particular project was not undertaken as an Association activity, it is another illustration of the underlying principle of related industry cooperation.

It seems to me that there are further areas of cooperation through joint trade association effort that might well be explored. I am not presuming to speak for the machine tool industry; these are just my personal ideas. For example, there is the serious problem of capital goods depreciation. We have worked closely with the automobile industry to get a more realistic tax depreciation policy and much more can be done through our joint efforts.

Permissible write-offs in practically all other countries of the world are much faster than those allowed in the United States. Under our tax structure it is impossible for American companies to retain out of earnings sufficient cash for replacement of capital equipment. This gives foreign competitors a distinct advantage.

Furthermore, the inability to write off equipment, such as machine tools, within the reasonably foreseeable future, results in hesitation as to modernization and tends to prolong the use of obsolete equipment at high operating costs.

The machine tool industry and the automobile industry have, for years, recommended accelerated depreciation. It was, as I understand it, due in considerable part to our efforts that there was writNMTBA

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ten into the law in 1954 the two new optional provisions for faster write-offs—the sum-of-the-digits option, and the double-decliningbalance option.

I understand all three industries—automotive, aircraft, and machine tool—are now in accord in urging further revision of the tax laws providing depreciation allowances. The machine tool industry is recommending that for deprecia-

tion purposes machine tools should be arranged in classifications with permitted write-off periods for each classification ranging between 7 and 10 years. In this proposal it has the support of these other industries that depend on machine tools and know the importance of obsolescence and rapid write-offs. It is also recommending a first-year additional depreciation allowance, as a modernization incentive. These

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Automatic Lathe & Turret Lathe

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Broaching Machine

E. H. H. Graf, Vice-President—Sales, Detroit Broach & Machine Co.

Cylindrical & Universal Grinding Machine

Jack T. Welch, Vice-Pres.—Field Sales, The Sheffield Corp.

Gear Equipment

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Heavy-Duty Upright Drilling Machine

Donald A. Taylor, Vice-Pres.—Asst. Secy., Swift Ohio Corp.

Horizontal Boring Machine

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Mechanical Metal Forming

John P. March, Treasurer, The Cincinnati Shaper Co.

Metal Sawing Machine

Stanley A. Woleben, Vice-Pres. and Secy., Armstrong-Blum Mfg. Co.

Milling Machine

Charles W. Knight, Vice-President, W. B. Knight Machinery Co. (Secretary)

Open Back Inclinable Press

Eugene P. Cunningham, Vice-Pres.—Sales and Administration, Clearing Machine Corp., Division of U.S. Industries, Inc.

Planer & Planer Type Milling Machine

John S. Madden, Sales Manager, The G. A. Gray Co.

Radial Drilling Machine

George K. Cassady, General Manager, Field Sales Div., Giddings & Lewis Machine Tool Co.

Sensitive Vertical Drilling Machine

Gilbert L. Allen, President, Chas. G. Allen Co.

Shaper

Alfred G. Baumgartner, Sales Manager, The Cincinnati Shaper Co.

Special Way Type and Transfer Machine

Howard N. Maynard, President, Snyder Corp.

Surface & Internal and Tool & Cutter Grinding Machine

F. Steele Blackall, III, Executive Vice-Pres., The Taft-Peirce Mfg. Co.

Threading Machine

George T. Bradner, Secretary-Treas., The Lees-Bradner Co.

Vertical Boring Machine

George H. Lynn, Manager, Machine Tools, Hamilton Div., Baldwin-Lima-Hamilton Corp.

proposals combine features that are characteristics of the depreciation setup in Canada and in Great Britain.

The problem of unduly-slow permissible write-offs is primarily one of machine tool users. A continuing get-together of the machine tool, aircraft, and automobile industries on this subject, through trade association committees, would therefore appear to be a construc-

tive step in achieving depreciation reform.

Another broad area which might well be mutually explored is that having to do with National defense; which is inextricably involved with the problem of foreign competition.

The development of items of National defense, and their production, devolve primarily upon the aircraft, automobile, and machine

tool industries.

Of necessity there is, and always has been, cooperation in the planning and engineering required, usually between individual machine tool builders and individual aircraft or automobile companies.

I am not suggesting that defense engineering is a field for trade association activity.

But I am suggesting that the trade associations in the automo-

tive, aircraft, and machine tool industries might well jointly concern themselves with the over-all threat to American defense capacity presented by foreign competition.

Machine tool companies, just as automobile manufacturers, are now having to build plants abroad in order to compete in foreign markets. Meanwhile, foreign-built automobiles and machine tools are entering the domestic market. Eventually this type of competition may affect the aircraft industry.

As we lose to foreign competition more of our domestic market—and if we have to put more plants abroad in order to compete in foreign markets—the sum total productive capacity of the United States is reduced.

How far can such a situation develop without threatening the safety of the United States?

What are the facts, regarding this picture, which should be presented to Washington? What steps, if any, can be taken to remedy the present trend? How can these three major defense industries—machine tools, aircraft, and automotive—work together and stick together, on behalf of common objectives, for the safety of the country?

Certainly this problem calls for careful and constant thought.

The machine tool industry is more alert than ever before to customer problems. Rate of change in technology and in products makes this imperative. But customer problems are by no means all production problems. There are many other fields of joint interest and concern; and some of these, I believe, might be constructively approached through joint trade association activity.

Ever closer cooperation between the machine tool, automotive, aircraft, and related industries is essential to a vital, active, and dynamic Program for Production U. S. A.!

NMTBA - POINTS TO REMEMBER

- 1—The aircraft and automotive industries represent two of the largest markets for machine tools—and without machine tools, these industries could not exist. These basic facts provide a firm foundation for continuous consultation and cooperation.
- 2—Cost reduction is the great challenge to the U.S.A. In view of the current situation with respect to wages, taxes, and material costs, the main remaining avenue to cost reduction is improvement in productivity. In this field, too, the automobile industry and the machine tool industry have a common problem. In machine tools, as in automobiles, foreign builders with low wage rates are now invading the domestic market. These are therefore areas of mutual interest.
- 3—There is the serious problem of capital goods depreciation. A continuing get-together, through trade association committees, of the machine tool, aircraft, and automobile industries on the problem of unduly-slow write-offs would appear to be a constructive step in achieving depreciation reform.
- 4—Another broad area which might well be mutually explored is that having to do with National defense—which is inextricably involved with the problem of foreign competition. It is suggested that the trade associations in the automobile, aircraft, and machine tool industries might well jointly concern themselves with the overall threat to American defense capacity presented by the inroads of foreign competition.
- 5—Customer problems are by no means confined to production problems. There are many other fields of joint interest and concern—and some of these, it is believed, might be constructively approached through joint trade association activity.
- 6—Ever closer cooperation between the machine tool, automotive, aircraft, and related industries is essential to a vital, active, and dynamic Program for Production U.S.A.!



Ludlow King, Executive Vice-President of the National Machine Tool Builders' Association, is dedicated to supporting a powerful National Defense. And for good reason! One of three brothers, all of whom graduated from West Point and fought in World War II, receiving seven Purple Hearts between them, he spent 26 years in industry in engineering, production, sales, and administration. His combined experiences make him keenly aware that "... the strength of our nation can be no greater than its productive capacity, and its productive capacity is dependent upon its machine tool industry."

Machine Tool SECTION

BORING
BROACHING
DEBURRING
DRILLING
GRINDING
HONING
MILLING
PROFILING
TAPPING
TRANSFERRING
TURNING

FOR ADDITIONAL INFORMATION please use reply card at back of Issue

SUNDSTRAND CORP.

HYDRAULIC TRACER LATHE— A 25 hp Multi Cycle hydraulic tracer lathe that permits three roughing and one finish turning cut to be made from the same template has been designed. The stylus and

cutting tool are closely coupled to reduce the possibility of deflection and other errors.

To simplify setup and insure maximum accuracy, graduated scales are provided for dog setting, template

Sundstrand Model 14T-25 Multi-Cycle hydraulic tracer lathe

positioning, tailstock positioning, and crossfacing slide location. Dial indicators at the top of the tracing carriage permit accurate depth setting of the first three cuts. After the three roughing cuts are taken, the tool turret indexes for the finishing cycle with a 0.020 in. depth of cut.

This arrangement makes it practical to use carbides for the first three cuts and finish the job with ceramic tools, if desired. The machine is designed with the rigidity and speed required for maximum utilization of ceramic tooling.

Circle 30 on postcard for more data

THE SHEFFIELD CORP.

ULTRASONIC MACHINE TOOL— Up to eight ultrasonic machining operations can be carried on simultaneously on a multiple-station Sheffield-Cavitron ultrasonic machine tool, or each station can be operated independently.

Materials for ultrasonic machining include germanium, silicon, ferrite, glass, quartz, and similar hard brittle materials and metals.

A single magnetostrictive transducer mounted in the well of the table transmits 20,000 ultrasonic machining strokes per second to each station by means of the curved cylindrical transmission lines. A remote 1000 watt high-frequency electronic generator drives the transducer. Each station accommodates a cutting tool up to 1.08 in. in diameter, to machine work-pieces to 0.050 in. depth. The table-high unit is approximately 4½ ft. in diameter.

Circle 31 on postcard for more data

NATIONAL BROACH & MACHINE CO.

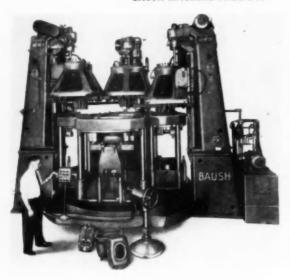
GEAR SHAVING PROCESS—A rotary gear shaving process that provides accurate control of surface finish, profile and lead on gears having twelve and less teeth has been developed.

The process makes use of an unusual precision rotary gear shaving cutter made in the form of an internal helical gear. This arrangement provides increased surface contact between the cutter and work gear profiles due to the enveloping action of the cutter. As a result, the cutter is able to produce smooth, accurate tooth profiles on work gears having small numbers of teeth.

Circle 32 on postcard for more data

Machine Tools

BAUSH MACHINE TOOL CO.



LEADSCREW FEEDS-The use of mechanical leadscrew feed for drilling, tapping, and reaming is featured on M-20 machines. Illustrated is a machine tool developed around three M-20 units. It is equipped with a 124 in. diameter table with four indexing stations. The three spindle units have 27 by 40 in. heads, featuring automatic cycling; a semiautomatic cycling for low production, and a jog cycle for setup. Feed can be varied from 0.005 to 0.090 in. per revolution and spindle speeds from 130 to 1050 rpm.

Circle 33 on postcard for more data clamping. In each chucking the work is vertical and located against the same milled face. Clamp members hold the part against positive locating plates, clamping outward in the first chucking and inward in the second. At the loading station an air cylinder depresses vertical rams that actuate the clamping members for both chuckings.

Five vertical units on the center column drill 12 holes and tap two of them. Two horizontal units on knees drill eight holes. Six of the units have multi-spindle auxiliary heads. Bushings guide 17 of the 20 drills for positive location.

Circle 34 on postcard for more data

KING-SEELY CORP.

SPINDLE FINISHING UNITS— Five spindle-type finishing machines designed to give continuous "in-line" production of precision finished parts have been announced.

The machines enable precision finishing of complex components such as gears, bearing cages, spline shafts, pump rotors, jet blades, etc. In most cases, 0.005 to 0.015 in. radii can be generated on hardened gear teeth contours in from 2 to 4 minutes, while surface rms is greatly improved. All surfaces of the part get the same precision finishing.

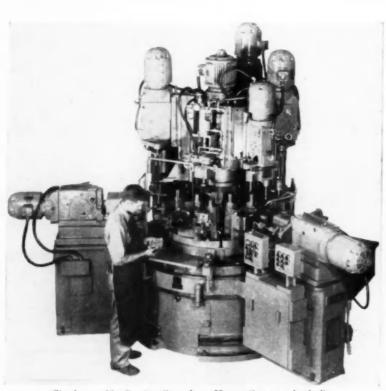
Circle 35 on postcard for more data

GULTON INDUSTRIES, INC.



IMPACT DRILL—Pictured is an ultrasonic impact drill which frees the operator from constant adjustments by use of an automatic tuning control system. The unit drills, slices, engraves, shapes, taps, broaches, dices, shaves, trepans and machines many types of material.

Circle 36 on postcard for more data



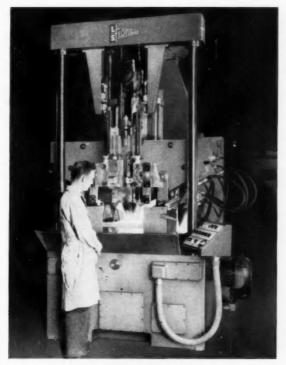
Kingsbury multi-unit automatic performs 22 operations on valve bodies

KINGSBURY MACHINE TOOL CORP.

MULTI-UNIT AUTOMATIC — This multi-unit automatic with center column performs 22 operations on valve bodies for automatic transmissions. Seven units drill and tap in two

chuckings of the work at a gross rate of 330 parts per hour.

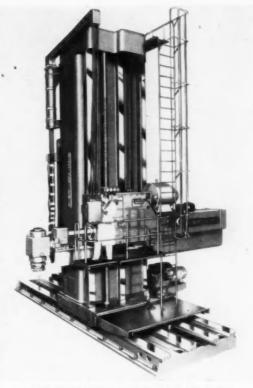
A 43 in, index table holds six double-chucking work fixtures with power clamping and automatic un-



THE LODGE & SHIPLEY CO.

VERTICAL MACHINE—The No. 12 vertical Floturn machine is specifically designed for "chipless" metal forming of parts ranging up to 16 in. in diameter and to 15 in. in length. The high production machine features an automatic cycle which may include automatic loading and unloading. The vertical design incorporates radially-opposed "Dual-Synchro" rollers which virtually eliminate deflection and assure accuracy. Automatic hydraulic tracer control is provided to make production of complex shapes a "pushbutton" operation. The machine produces conical, cylindrical, contoured shapes or combinations of these shapes from flat blanks or machined blanks.

Circle 37 on postcard for more data



GIDDINGS & LEWIS MACHINE TOOL CO.

HORIZONTAL MACHINE—This Series 80 horizontal boring, drilling and milling machine, with an eight or ten inch diameter spindle, features vertical lead-stock travel in excess of 20 ft., heavy-duty welded steel construction and new operating advantages. Illustrated is the Model 880-FUAR floor-type with an underarm. It has an eight inch diameter spindle, 84 in. spindle underarm travel, and 20 in. column travel.

Circle 38 on postcard for more data

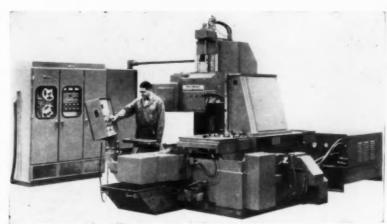
PRATT & WHITNEY CO., INC.

TAPE - CONTROLLED MILLING MACHINE — Continuous automatic milling of regular and irregular shapes in three dimensions under the direction of tape-reading numerical control is accomplished by this Numeric-Keller machine.

Punched tape automatically controls the horizontal and transverse movements of the table, the vertical movement of the cutter spindle, and the feed rates. The operator is required only to push a button to start the tape, change the tooling as required, and set the spindle speeds.

The machine is capable of both heavy and delicate work under tape direction.

Circle 39 on postcard for more data



Pratt & Whitney Numeric Keller features continuous, tape-controlled milling in three dimensions

Machine Tools



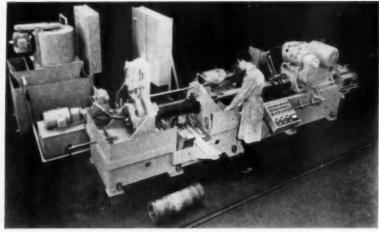
Moline M43 milling machine for jet engine compressor housings

MOLINE TOOL CO.

MILLING MACHINE—Six annular grooves and the tops of six ribs around the outside surface of jet engine compressor housings are milled by this specially designed, six-spindle milling machine. The spindle rpm can be varied through a range of 6

to 1 and the horizontal feed rate of spindle slide is adjustable and is provided with positive stops to control depth of cut. Rotational feed rate of the table is also adjustable. Parts from 24 to 52 in, can be handled.

Circle 41 on postcard for more data



Micromatic Model 8-612 heavy-duty horizontal Microhoning machine

MICROMATIC HONE CORP.

HORIZONTAL HONING MA-CHINE—Used primarily on applications requiring heavy or rapid stock removal from large diameters and long bores, this Microhoning machine features a special feed unit. Capable of exerting a thrust force measured in tons instead of pounds, it makes possible the removal of 1.3 cu-in. of stock per minute from oil well liners hardened to 64 Rockwell "C." These bores range from 4.50 to

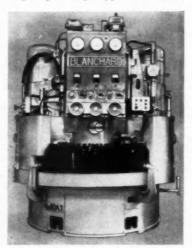
7.75 in. in diameter and up to 30 in. long.

The machine has two separate feed clutches: one for rapid approach and tool collapse; the other for finer feed. The feed unit also includes a mechanism that automaticaly compensates for wear. It has a 4 ft hydraulic head stroke, 8 speed transmission, and is equipped with a variable delivery hydraulic pump and tank unit.

Circle 42 on postcard for more data

THE BLANCHARD MACHINE CO.

AUTOMATIC SURFACE GRINDER—Designated as the No. 80-A3, this center column automatic surface grinder has an 80 in. OD work table and three grinding wheel spindles. Each wheel is maintained at correct height by a "finger-type" feed control



Blanchard 80-A3 automatic surface grinder.

caliper. Since the work table is non-magnetic, all parts are held in fix-tures during the grinding cycle. The machine pictured is used to rough grind both sides of both ends of automotive connecting rods.

Circle 43 on postcard for more data

ROCKWELL MFG. CO.

METAL CUTTING LATHE — The variable speed drive of a Delta 10 in. metal cutting lathe gives the operator all the advantages of variable speed from 50 to 500 rpm plus the high torque transmitting power of matched V-belts in the final drive to the spindle.

The % in. collet capacity is obtained by using a 4-C style collet with a 15/16 in. hole through the spindle.

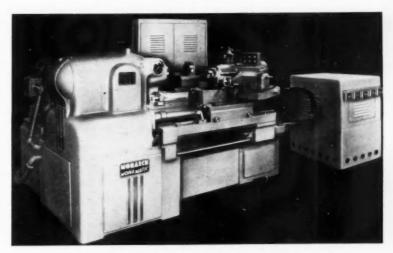
Circle 44 on postcard for more data

THE MONARCH MACHINE TOOL CO.

TURNING MACHINE — Designated as the Model 20-H Mona-Matic, this machine is a fully automatic double carriage turning machine, with a 60 degree "air gage tracer" controlled front tool slide. A variety of automatic cycling arrangements provides high productiveness and versatility.

It is available in 18, 30 and 42 in. center distance. Swing over bed is 15 in.; over front slide and rear slide ways, 8 in. Bed ways are flame hardened and ground. Eight spindle speeds are available by pick-off gears in each of three standard ranges. The tailstock has an air actuated spindle and inbuilt, heavyduty, anti-friction center. Feed rates are variable from 1 to 40 ipm; carriage traverse is 200 ipm.

Circle 45 on postcard for more data



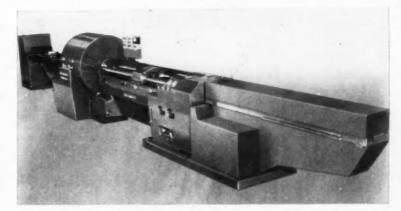
Monarch Model 20-H Mona-Matic automatic double carriage turning machine

CINCINNATI MILLING MACHINE CO.

MACHINING PROCESS—With the Cincinnati Intraform shown above, profiles on the ID of cylindrical workpieces can be formed quickly and easily without the need for expensive tooling.

Hollow cylindrical stock is placed over a mandrel and squeezed by pulsating dies. At the completion of the operation, the profile of the mandrel has been reproduced in the ID of the part and the hardness, tensile strength and surface finish have all been improved. ID profiles produced by the machine range from internal shapes on which close tolerances are not required to the highly accurate lands and grooves in rifle barrels.

Circle 46 on postcard for more data



Cincinnati Intraform uses a set of four forming dies which pulsate rapidly while revolving around the OD of the workpiece.

AUTOMATION TOOLS, INC.

FACE MILLING MACHINE — The Luft line face milling machine unit is designed specifically to perform an accurate facing or milling operation in any given position. It may be mounted conveniently to do any job, can be used for boss milling, face milling, counter boring, etc., and can be handled speedily and economically.

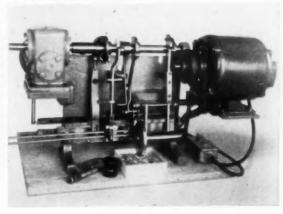
The motor is of vane type design using precision ball-bearings on the shaft and is pressure lubricated through the main feed line. The facing head feeds automatically at the rate of 0 to 0.015 in. per revolution.

Circle 47 on postcard for more data

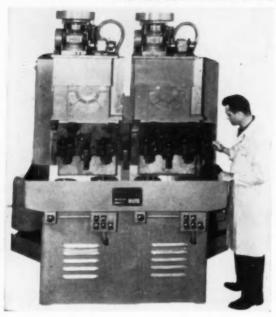
AUTOMATIC CUT-OFF MACHINE This automatic cut-off machine, for small diameter, round tubing, permits production rates up to 12,000 pieces per hour. Basically designed for volume users of aluminum, copper, brass, or other copper alloy tubing up to 7/16 in. OD, the machine provides precision cutting ±0.005 in. of piece length for cut-off lengths up to two in. Circle 48 on postcard

for more data

H & H MACHINE CO., INC.



THE NEW BRITAIN MACHINE CO.



BORING, TURNING AND FACING MA-CHINE -- Principal component of these machines, which perform precision boring turning and facing operations, is a ductile cast iron head supporting a vertical slide and cross slide. These tool slides are actuated by a pair of cams mounted on a common shaft which is itself carried with the vertical slide. The base on which the head rests is of cast construction and serves as a housing for carriage type spindles. The BV machine is capable of heavy cuts on castings and forgings as well as precision cuts of less than 0.0005 in. on finishing operations.

Circle 49 on postcard for more data

MODERN INDUSTRIAL ENGINEERING CO.



TOOTH TOPPING MACHINE-This tooth topping machine is designed to remove nicks and sawtooth edges from the pinion teeth of spiral bevel gears before they go into heat treatment. To top a pinion, it is placed on the driver locater in the center of the machine. It is held with the right hand so that the tooth faces bear against the drivers. Clamping is pneumatic. When the unit starts, the work tilts into cutting position. Cycle time for a 10tooth pinion is about 10 seconds. Change gears at the left of the machine provide the necessary adjustments for pinions of different ratios. machine can handle both right and left hand pinions by reversing the master control switch in the control panel at the rear.

Circle 50 on postcard for more data

MECHA-FINISH CORP.

DEBURRING, FINISHING — The Mechamatic Unit No. MM-4-8 is designed for deburring and finishing a variety of parts. It can handle paired components which must be deburred and remain together, such as connecting rods and caps.

The parts are mounted on spindle fixtures, air operated, which are submerged, while rotating, in a fluid abrasive mass which simulates a form fitting grinding wheel, regardless of the shape of the piece part and travels at a rate of 300 to 600 sfm. At a one minute time cycle the machine will produce 480 pieces per hour.

Circle 51 on postcard for more data

SENECA FALLS MACHINE CO.

AUTOMATIC LATHE — The automatic loader of the IMP automatic lathe feeds heavy couplings into a cradle where they are picked up by an injector head and chucked into an air-operated chuck. The machine turns the outside diameter, forms the radius on the flange and chamfers the bore on the coupling. The finished piece is automatically ejected, picked up by a safety finger and dropped on an evacuation chute. By using this automatic loader, production of 450 pieces per hour is easily maintained.

The IMP and the automatic loader are designed for operations demanding high spindle speeds, fine finishes and extreme accuracy. It is also suitable for turning heavier work such as small pistons, bushings and gear blanks.

Circle 52 on postcard for more data

ENGELBERG, INC.

CENTERLESS BELT GRINDER—Designed for heavy-duty precision grinding and finishing of rod or tube stock, the Engelberg Model #8132-HD features a large workpiece capacity, a powered outboard support package, and an automatic reverse feed mechanism. It will handle stock from 1 to 9 in. in diameter, and up to any length. Average through-feed rates at a four degree helix angle setting of the regulating wheel and power feed stands vary from 2½ to 20 fpm.

Abrasive belt size is 8 by 132 in., with belt speed of 4500 sfpm. The machine is equipped with air-belt tensioning, a 50 hp belt drive unit with all electric controls, and a complete recirculating system of 200 gallon capacity with ½ hp coolant pump.

Circle 53 on postcard for more data

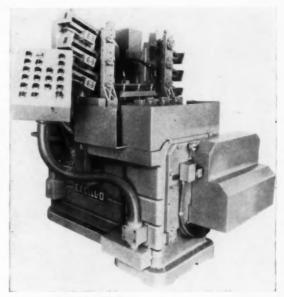
EX-CELL-O CORP.



DRILL JIG BUSHING — These drill jig bushings are for use in plastics. The bushings are made of oil-hardening bearing steel. Two basic types are affered—one for embedding in castable materials and one for pressing into holes in plastics, wood or other soft or ductile materials.

Circle 54 on postcard for more data

Ex-Cell-O precision boring machine faces both ends of steel gear blanks. At the completion of machining, the table retract and the unloading arm wings down, pulls the parts off the arbors and deposits them in the unloading chutes.



EX-CELL-O CORP.

MAXWELL INDUSTRIES, INC.

CARBIDE TOOL HOLDER—Universal-positioning "Throwaway" carbide tool holders combine the economy of throwaway inserts with universal positioning for all metal turning and shaping operations. The holder eliminates the need to change holders from right to left hand or straight during a sequence of operations. When indexing the insert, it is not necessary to disturb the setup by taking this holder out of the machine. Only the cap assembly is loosened, the carbide indexed, and cap retightened. The holder remains on center of the work-piece.

Circle 55 on postcard for more data

BORING MACHINE—This standard cam-operated precision boring machine faces both ends of steel gear blanks, chamfers both ID and OD and generates a radius on the hub faces. Automatic loading and unloading arms are provided which pick out and deposit the parts into special chutes.

Machine operations begin when fingers on the loading arm pick three parts from the loading chutes. The arm swings down and loads the parts on expanding arbors. After air-actuated clamping is complete, the arm returns, picks out three more parts and comes to rest in an upright position. At this point the machine table advances and number one tool chamfers the OD, faces the gear face, generates a radius and faces the gear hub. Tool number two then performs identical operations on the reverse side of the part, while tool three plunges a chamfer on the front ID.

Circle 56 on postcard for more data

SNYDER CORP.

INDEX MACHINE — This special five-station rotary index machine mills, drills, countersinks, spotfaces and taps the carburetor pads in three different truck engine intake manifolds. It produces at a rate of 109 pieces per hour at 100 per cent efficiency.

To handle this variety of parts, three different design methods have been applied. These include: 1. A two-position drill unit with two-position single spindle drill head. 2. Interchangeable pot heads and 3. A two-spindle tap head with one of the spindles used at a time for a part.

The machine is made up of an assembly of standardized modular compartments including a 60 in. diameter table with a fluid drive index mechanism, wing bases, vertical columns, way-type slide units, milling heads, drill heads and tapping heads with lead screw drives. A separate motorized unit provides power for the hy-



Snyder five-station machine mills, drills, countersinks, spotfaces, and taps

draulically operated, electrically-controlled machine, equipped with a

pushbutton control panel.

Circle 57 on postcard for more data

Machine Tools

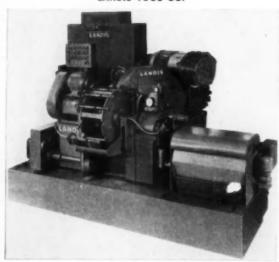
THE EDLUND MACHINERY CO.



LAYOUT MACHINE—The No. 2 layout machine performs such layout operations as center drilling, and drilling and reaming in parts which do not require jig boring tolerances, such as drill jig bushing plates and templates.

Circle 58 on postcard for more data

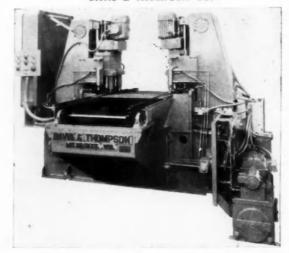
LANDIS TOOL CO.



CYLINDRICAL PRODUCTION GRINDER—Landis R plunge grinders CTLINDRICAL PRODUCTION GRINDER—Landis R plunge grinders are designed for production infeed grinding cylindrical work with completely automatic operation, and are available with straight or angular wheel heads. A formed grinding wheel or several grinding wheels can be used. This makes it possible to grind a face and several diameters in one operation.

Circle 59 on postcard for more data

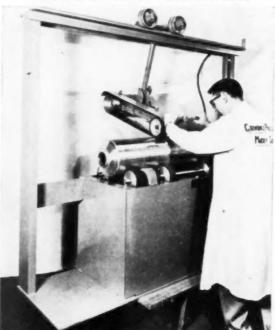
DAVIS & THOMPSON CO.



AUTOMATIC TRANSFER UNIT-Pictured is a Roto-Matic Transfer Machine designed for chamfering both sides of both ends of a rear axle tie rod. The machine is adaptable to a wide range of operations. The machine, weighing 6600 lb. will produce 666 parts per hour.

Circle 60 on postcard for more data

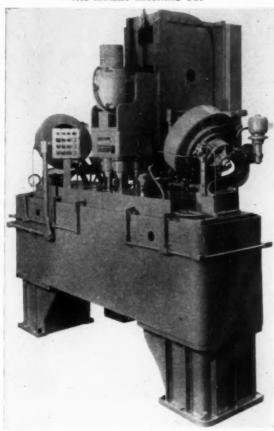
GRINDING & POLISHING MACHINERY CORP.



BELT GRINDER—Pictured is the G & P 6-72 abrasive belt grinder unit being used with an OD grinder. The belt unit is suspended above power rollers and a variable speed motor regulates the rotation of the cylinder while the operator moves the grinder across the part. The belt unit can be used either as a primary or auxiliary part of a machine.

Circle 61 on postcard for more data

THE MORRIS MACHINE CO.



TAPPING MACHINE—Completely automatic tapping operation is teatured on this unit type tapping machine, Model 409-3. Designed to process locknuts, the unit selects, positions, loads, taps, and ejects 1215 pieces per hour at 80 per cent efficiency.

Circle 62 on postcard for more data

GARDNER MACHINE CO.



SPINDLE DISK GRINDER—Pictured is the Gardner 2H30 double horizontal spindle disk grinder which faces and grinds bearing cups, removing 0.025 in. of stock while holding close tolerances.

Circle 63 on postcard for more data

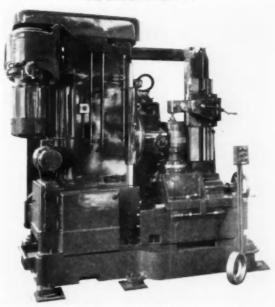
THE ELOX CORP.



ELECTRICAL DISCHARGE MACHINE—This unit is being used to produce extrusion dies, powered metal dies, cold heading dies, blanking dies, multiple pierce dies and three dimensional cavities.

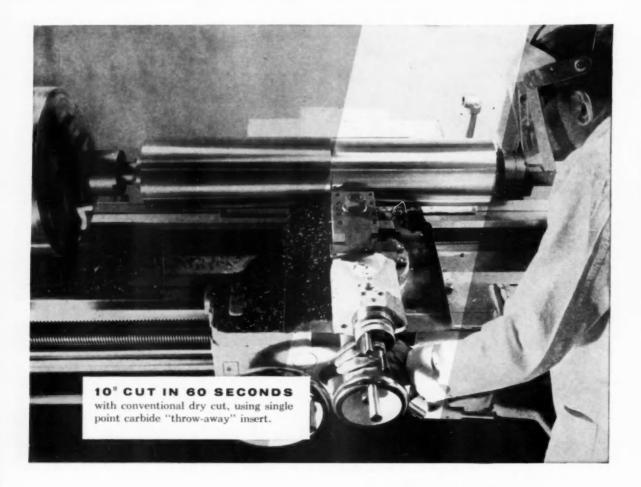
Circle 64 on postcard for more data

THE LEES-BRADNER CO.



GEAR HOBBING MACHINE—The Model "R" gear hobbing machine has a maximum vertical hob travel of 18 in. With the tailstock column in place, the machine handles maximum work diameters of 16 in.

Circle 65 on postcard for more data (Turn to page 139, please)



A new cutting fluid that with any single-point

Shell's experience in the last 3 years proves that Shell Dromus Oil E can give production increases of at least 25% with comparable cost savings.

Incredible as this may seem, Dromus® Oil E alone accounts for these considerable production increases! And here's how simply Dromus E does it: Use Dromus Oil E (diluted with 20 parts water) at the correct cutting speed. Then, increase the feed rate by one-third and operate as before. You can get a 25% production increase . . . optimum conditions may show as high as 40% improvement!

Applies to wet or dry cutting. Regardless of whether you're now cutting dry, or with emulsions or heavyduty oils, this simple increase of feed applies.

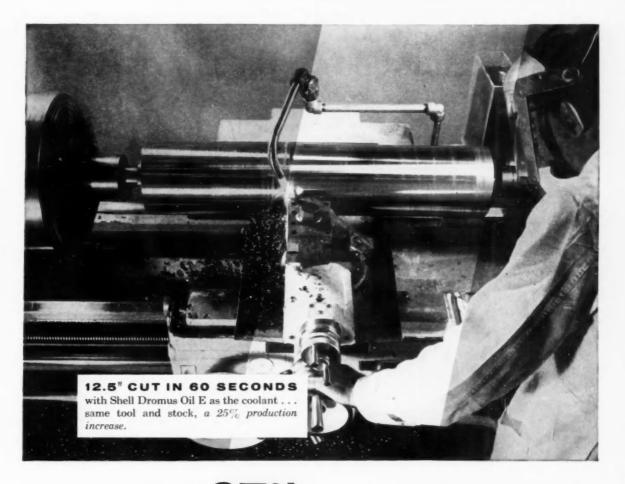
Applies to all milling, turret and automatic lathe set-ups. This is an across-the-board production im-

provement. If the machine can stand the extra 25% feed, the rule applies to all milling and turning jobs!

Applies to set-ups as they are . . . no changes required. There isn't a single thing that has to be changed or adjusted . . . just the feed and provision for keeping the work wet with Dromus E.

Shell Dromus Oil E offers these many other outstanding benefits too!

- 1. Greater worker safety-chips are cool.
- No fire hazard—Dromus E is nonflammable even after water evaporation.
- Closer dimensional tolerances can be obtained less heating of the work piece occurs.
- 4. Brighter surface finish is obtained.
- 5. Excellent protection against rust.



permits 25% greater feed

carbide "throw-away" insert

Dromus Oil E is one of those products that comes up once in a generation. Rather than attempt to offer proof after proof of what this announcement offers, we simply invite you to let the Shell Industrial Products Representative show you what Dromus Oil E can do in *your* plant! Please write Shell Oil Company, 50 West 50th Street, New York 20, New York, or 100 Bush Street, San Francisco 6, California. In Canada: Shell Oil Company of Canada, Limited, 505 University Avenue, Toronto 2, Ontario.

SHELL DROMUS OIL E

THE NEW COOLANT FOR METALWORKING



4 Types of Multi-Unit Automatics for **High Production to Close Tolerances**

Each of these four machines on our assembly floor is a different type. Each one is the most efficient setup for its particular job.

But these different types of machines are alike in these ways -

- Operations. Drill, counterbore, ream, tap, mill (light cuts), etc.
- High production. A number of automatic units of ½ to 5 hp each perform different operations at the same time.
- . Close tolerances. Few rejects. Little downtime. Each machine has good basic design and rugged accurate construction.
- · Ready to produce. Samples run for approval before shipping machine.

For a specific proposal ask our representative in your area. Or write us. Kingsbury Machine Tool Corp., Keene, New Hampshire.

REPRESENTATIVES

California Los Angeles 22 Moore Machinery Co West Hartford 7 O C Stevens Mchy Co Connecticut Illinois Chicago 51 Indiana Detroit 19 Michigan **Grand Rapids 4** Missouri St. Louis 24 New York Syracuse 1 Cincinnati 2

Dayton 2 Pennsylvania Philadelphia 6 Pittsburgh 37

Four States Mchy Co Indianapolis 20 C C Garrett Mchy Birmingham & Conner Joseph Monahan R R Stephens Mchy Co Long Island City Triplex Mach Tool Co Syracuse Supply Co E A Kinsey Co Golden & McCov Co Cleveland 3 C H Gosiger Mchy Co John S Wright, Mchy Merit Machinery Inc

Barker Indus Eq Ltd

REGULAR INDEXING

For most high production work. Perform successive operations from one direction or several. Index units in four sizes: 12-, 20-, 26- or 40-inch. Four to 10 stations (12 with 40-inch).

CENTER COLUMN INDEXING

For more operations or larger parts than the regular indexing machines can handle. 8 to 14 stations, 43- or 63- inch index table. Horizontal units mounted on knees. Easy access to tools.

NON-INDEX (WAY TYPE)

For operations from 2 or more directions on one part at the same time. When a job needs successive operations, two or more of these machines may make the most efficient setup.

Canada

VERTICAL INDEXING

For successive operations from opposed directions with up to 5 horizontal units on each side of the machine. Up to 4 radial units provide a third direction. 8 stations in a vertical plane.



GET *MORE FOR YOUR MONEY



BULLARD

Horizontal Boring Machine • Model 75

The Gas Turbine Department of the General Electric Company, Schenectady, N.Y., recently installed a Bullard Horizontal Boring Machine, Model 75. We are confident that they got more for their money.

This "MORE" includes: -

GREATER RIGIDITY - heavier cuts at higher speeds.

PRECISE ACCURACY — hold boring tolerances to .0005.

TABLE OUTBOARD SUPPORTS — provides work alignment even with unbalanced table load.

PENDANT CONTROL — full machine control from position most advantageous to operator.

CHROME HARDENED WAYS - on Bed and Saddle for longer wear.

BED LEVELS - built into Bed for easy checking.

FAST SERVICE — after two years of operation, little trouble, and minor complaints handled promptly.

Investigate and compare and you, too — will discover you get more for your money with a Bullard H. B. M., Model 75.

Circle 139 on Inquiry Card for more data

ASK YOUR BULLARD SALES ENGINEER OR WRITE FOR FULL SPECIFICATIONS TO..

THE BULLARD COMPANY
BRIDGEPORT 9, CONNECTICUT

For exactly the right grinding machine ...choose from the world's



CYLINDRICAL GRINDERS. Norton Cylindrical Grinders, designed for speed, accuracy and durability in single-piece or high volume production, are easily adjusted to changing requirements. Available with swing capacities from 4" to 30", as plain machines or semiautomatics. All Norton Cylindricals provide for exceptional ease of operation and servicing.



NEWEST CENTERLESS GRINDER. The new Norton No. 2 Straddle-Bearing Centerless Grinder features straddle support of spindle bearings, adding strength and ability to take tough jobs. Many other features, including mobile wheel head and constant work-loading alignment, are major advancements in centerless grinding.



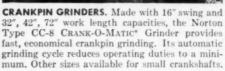
UNIVERSAL GRINDERS. Norton Type U-4 Universals do external, internal, face and angular wheelslide grinding fast and efficiently. Especially easy to set up and operate, they bring time-saving advantages and important economies to many jobs. Swing capacities: 10", 12", 14", 18".



SURFACE GRINDERS. You finish flat faster with the new Norton Type S-3 Hydraulic Surface Grinder. New cost-cutting features make this 6" x 18" Type S-3 equally dependable for long production runs or many toolroom grinding jobs. It produces plane surfaces smoothly, with automatic or manual cross feed and fast, cool-running action.

largest line





CAMSHAFT GRINDERS. Automatic and hydraulic, the Norton No. 3 CAM-O-MATIC* Cam Grinder brings you built-in operating skill that improves cam contours, gives better finish and increases output. Rapid, automatic action reduces the operator's duties to loading, then moving one lever. Sizes: 5" x 26", 30", 40".



TOOL AND CUTTER GRINDERS. Among Norton machines of this type, the No. 20 is outstanding for its tilting wheel head which tilts up to 15 degrees above or below horizontal and swivels through 360 degrees. This and additional Norton improvements cut time and simplify grinding on many usually slow, difficult jobs.



LAPPING MACHINES. The Norton No. 16FC Lapping Machine, using cast iron laps, refines flat or cylindrical work to extremely close tolerances and a high finish. Its repetitive accuracy reduces inspection and eliminates selective assemblies. Other sizes, and types using bonded abrasive laps available.

Norton grinders and lappers, the world's largest line, include many not shown or mentioned here. Among those that combine grinds for maximum economy the CM-1 Multi-Wheel Grinder plunge-grinds line diameters and the CV-4 Angular Wheelslide Grinder finishes diameters and adjacent thrust surfaces - all simultaneously. Built into all Norton machines is the "Touch of Gold" - the engineering achievement that helps you improve product quality and boost production profits. And for expert aid in selecting and operating the finest grinding equipment for your own production, ask for Catalog No. 1843-19 or contact your Norton Man — a trained grinding engineer. NORTON COMPANY, Machine Division, Worcester 6, Mass. District Offices: Worcester, Hartford, Cleveland, Chicago, Detroit. In Canada: J. H. Ryder Machinery Co., Ltd., Toronto 5.

*Trade-Mark Reg. U.S. Pat. Off. and Foreign Countries



Making better products... to make your products better
NORTON PRODUCTS: Abrasives · Grinding Wheels · Grinding Machines · Refractories · Electro Chemicals — BEHR MANNING DIVISION: Coated Abrasives · Sharpening Stones · Pressure Sensitive Japes

The Know-How Dimension in Milling Machines.. Special Machinery.. Automation Equipment trimit A section of our assembly flo showing Automation-Type Ma-chines in process of manufacture. No. 2-20 Miller . . 20 table travel . . 42" x 12" table . . full automatic hydraulic feed. No. 1-14 Miller . . 14" table travel . . 32" 9" table . . hydraulic table feed . . full automatic cycle. No. 3-36 Miller . . 36" table travel . . 64" x 16" table . . full autonatic hydraulic feed.

.. makes the difference in cutting costs .. increasing production

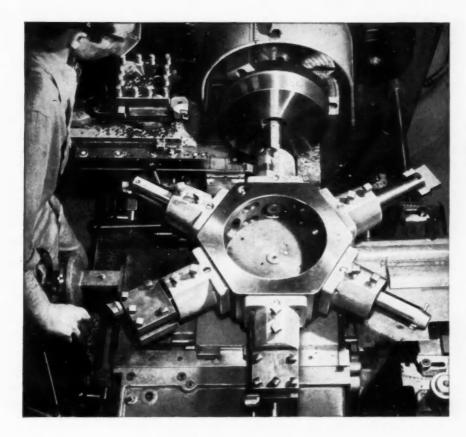
Know-How, born of years of experience, abetted by sound and imaginative design and quality manufacturing standards... is the reason why many of our customers, representing a wide and diversified coverage of industry, come back to us again and again for answers to their production problems.

When you are considering procurement of machinery for your milling needs . . . or seeking the solution to other production problems...you may wish to consider a Kent-Owens Milling Machine or a Special Machine designed for a distinctive and individual application. Contract Machine Building (customer designed equipment) is another of our specialties.

Write or call . . . Kent-Owens will be pleased to quote your requirements. Kent-Owens Machine Company, Toledo 10, Ohio.

KENT-OWENS

Designers and Builders of Milling Machines and Special Machinery







Expert setup gets more work per chucking

How manufacturer uses C/F turret lathe to produce variety of chuck bodies with only one tool change

To do the job, the manufacturer selected a Gisholt 1L Saddle Type Turret Lathe with a cross-feeding hexagon turret. A 15" 3-jaw air chuck holds down chucking time. One set of adjustable serrated jaw bases handles the different workpiece sizes for first machining operations. A quick-indexing square turret on the cross slide carries turning, facing and chamfering tools, which work simultaneously with tools on the hexagon turret.

Three stub boring bars on the hex turret bore, counterbore, recess and back face. Because size is set with the cross-feeding turret, these same boring bars are used on different part sizes. Also on the hexagon turret are 2 box-type tool posts for facing, boring or recessing—used for different size workpieces because of the cross-feeding

feature. A threading attachment lets the manufacturer thread the hubs, and a taper attachment handles up to 8 inches taper per foot when required.

The sixth tool on the hex turret, a spade cutter, is used for final sizing and is the only special tool changed for each job.

Simple, low-cost tooling combined with the cross-feeding hexagon turret offers maximum efficiency in handling various sizes of similar parts. The rugged Gisholt MASTERLINE Saddle Type Turret Lathes have the speeds, feeds and power to complete the work in the least amount of time. Call your Gisholt Representative today, or write Gisholt for literature.



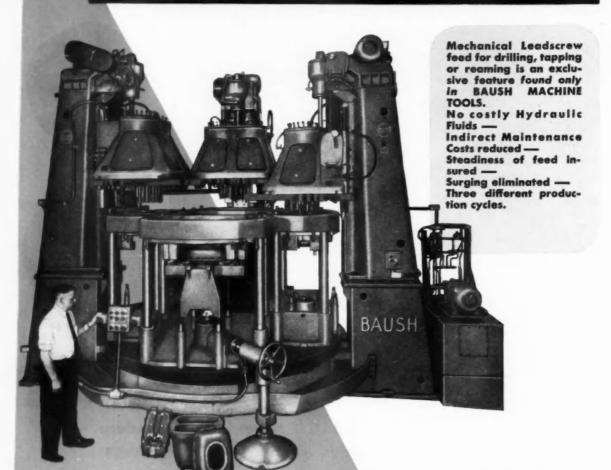
G SMACHINE COMPANY

Madison 10, Wisconsin, U.S.A.

WRITE TODAY for complete set of Gisholt MASTER-LINE Saddle Type Turret Lathe Bulletins.

VERSATILE MECHANICAL LEADSCREW MACHINE

With Master Fixture Holding Units and Mounting Plates, Drills, Taps and Reams 39 Different Parts of Gas Meter Accurately and Economically



SPECIFICATIONS:

Each of three vertical columns mounts an M-20 Mechanical Leadscrew Machine. The 124" diam. Semi-Automatic Hydraulic Rotary Indexing Table has four stations. M-20 Units are mounted at Stations 2 - 3 and 4. Each head is 27" x 40" and is bered for 32 spindles with 32 upper spindle drivers 1\(\frac{1}{2}\). in diam, arranged for 2 speeds and a neutral position. Both feed and spindle speed are variable . . feed can be varied from .005 per Rev. Low to .090 per Rev. High, and spindle speeds from 130 RPM to 1050 RPM.

Feed is thru ball screw direct from spindle driving gears. When a head goes from rapid traverse to feed stroke an electric brake holds leadscrew and shuts off traverse motor— saving wear and tear. Heads have automatic high production cycle — semi-automatic low production cycle, and a jog cycle for set-up. Machine has 98 spindles and adjustable arms. Operation sequence is: Station 1 — Unload and load

Station 3 — Multiple Drilling
Station 3 — Multiple drilling, chamfering and reaming.
Station 4 — Multiple Tapping (Master Leadscrew Method) Machine has:

3 — 20 HP 1800 RPM motors for spindle drives 3 — 1 HP 900 RPM motors for Rapid Traverse Heads

1 - 71/2 HP 1200 RPM motor operating Rotary Table.

Write for literature on this **NEW M-20 MECHANICAL** LEADSCREW machine NOW. Send us your problems our Engineers can help you.

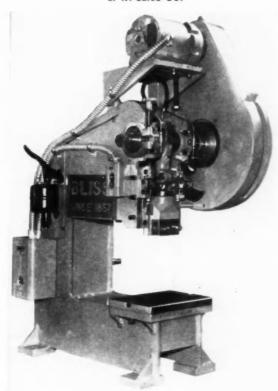


Forming Equipment SECTION

STAMPING STAMPING EXTRUDING FORGING SHEARING

FOR ADDITIONAL INFORMATION please use reply card at Back of Issue

E. W. BLISS CO.



DEEP THROAT BENCH PRESS - Designed for high speed punching, cutting and forming operations on large wide sheets, this seven ton deep throat bench press weighs 600 lb and requires a bench space of 27 by 13½ in. and floor space with stand of 28 by 23 in. Designated the 018-DT, the press has a 11/4 in. standard stroke and is available with a maximum stroke of $2^{1/2}$ in. Throat depth measures 14 in. Features of the unit include a fully stress-relieved for greater stability and rigidity; the Bliss rolling key clutch; extra long gibs which support the slide at all positions and a heavy duty crankshaft precision forged of SAE 1045 steel. Circle 247 on postcard for more data

PARKER-HANNIFIN CORP.

DOUBLE LAP FLARER—A pneumatically operated machine for forming a double flare on the end of ferrous and non-ferrous tubing handles tubing of ½ through ½ in. outside diameter with wall thicknesses of 0.028, 0.035, 0.042 and 0.049 in.

The machine is approximately four feet high and weighs 285 lb. Operating pressure is 70 to 120 psi.

Circle 248 on postcard for more data

KENCO MFG. CO.

SAFETY ENGINEERED PRESS—The eight ton Electro-Safe punch press is designed for safe, economical operation. Using the press for single-trip operation, the operator must depress two widely separated hand controls, and hold until the ram reaches the bottom of the stroke. The operator cannot fasten one control in the "down" position—both must be depressed and released to complete a stroke. Any press failure, either mechanical or electrical, must fail safe.

The press can be locked in any desired setting—continuous, single, inch, or foot control—by authorized personnel. Removal of the key prevents the operator from making changes which

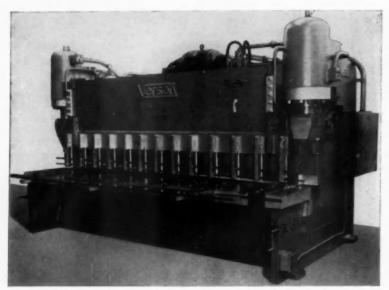


Kenco eight ton Electro-Safe punch press

might endanger him or the machine. To protect the die, a safety stop switch in the control panel enables any type of mechanical or electrical detectors to stop the ram immediately if imperfect feeding or stamping is detected. The press is for trimming, forming, drawing, embossing, coining, staking, and assembly.

Circle 249 on postcard for more data

Forming Equipment



Verson No. HPS-750-12 hydraulic shear with capacity of 12 ft lengths of 3/4 in. mild steel

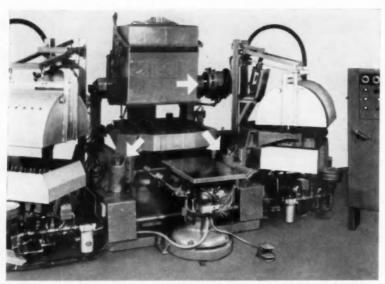
VERSON ALLSTEEL PRESS CO.

HYDRAULIC SHEARS—A line of hydraulic shears is available with shear capacities of standard models ranging from 8 ft lengths of % in. mild steel, through 12 ft lengths of 1½ in. mild steel. Special capacities are available to meet any requirement.

The shears are designed with a minimum shear angle of 1% in. per ft, eliminating curling of the sheared piece. All shears are equipped with automatic control to keep the ram operating at a predetermined shear angle. This angle is adjustable by a handwheel located at the operator's station.

A stroke control, with limit switches both top and bottom, is adjustable through the entire range of the stroke. When narrow pieces are sheared, the stroke can be shortened to obtain greater productivity.

Circle 250 on postcard for more data



Twin shell molding machine equipped with three Rotac torque actuators for shell molds

EX-CELL-O CORP.

TWIN SHELL MOLDING MACHINE—Using three standard Rotac torque actuators, made by Ex-Cell-O, the machine illustrated produces finished shell molds, alternately on two stations. This machine produces molds for two different jobs at the same time. It can run with either station inoperative and does not require skilled labor. The machine is made by Shell Process, Inc.

A standard HN-63-IV Rotac torque

actuator is operated at varying pressures up to 800 psi and is used to rotate investment chamber 180 degrees, and to return it at the end of cycle. Two standard HN-63-1V Rotac torque actuators are used to swing patterns from investment to ejection stations. This application follows the best design practice utilizing separate outboard bearings to take heavy radial loads, external stops, and smoothly decelerates movement of mass by

cams which close a valve to stop the movement gradually in each direction. The circuit also includes relief valves set to limit the pressure which can build up within the actuator and other circuit members.

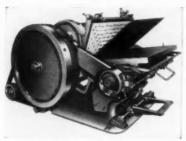
Circle 251 on postcard for more data

THOMSON-NATIONAL PRESS CO.

CUTTING - CREASING PRESS— This 28 by 41 DM (double micrometer) cutting and creasing press has a die-cutting load of 80 tons.

The double micrometer design allows for impression adjustment in thousandths of an inch on either one or both sides of the press as required depending on press wear overtime. The press is also equipped with a hinged cutting plate so that makeready corrections can be made without removing the plate from the press.

Circle 252 on postcard for more data



Thomson-National cutting-creasing press

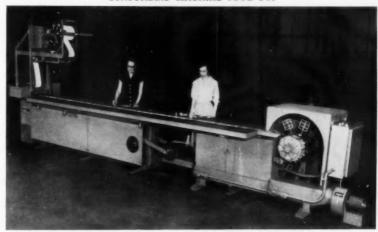
AMERICAN STEEL FOUNDRIES, ELMES ENGINEERING DIV.

HIGH-SPEED PRESS—A 500-ton hydraulic press unit has been designed for high-speed, hot forging operations, for both open and closed die work. Bolster plates are fastened to the slide and press bed, with T-slots provided. Key ways are cut into bolsters to facilitate die alignment and to prevent misalignment of dies during forging operations. Long bronze bushed guides are used on the slide with full tonnage stops around the columns to prevent overstroking of the slide.

The press can be operated by either of two control levers, both serving the same function. One is at the press itself and one is at a remote location. The same lever controls are used to obtain short and rapid planishing strokes at full pressure.

Circle 253 on postcard for more data

SUNDSTRAND MACHINE TOOL CO.



THERMOFORMING MACHINE—Thermoformed packages—known as "blister," "bubble," or "dome-pack"—can be formed in a wide range of sizes and shapes on this Sundstrand-Packmaster Model 58. Packages measuring 4 x 4 in. are produced at a rate of 60 per minute.

Circle 255 on postcard for more data

HYDRAULIC PRESS MFG. CO.

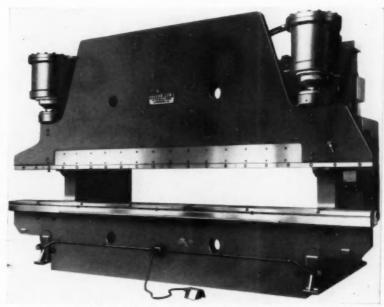
SERVO-CONTROLLED PRESS—Design features of this H-P-M servo-controlled C-press provide absolute control of all press actions without unnecessary and space taking linkages. At the top of the stroke the valve is in the closed position. Then the operator depresses the lever and the spiral cam connected to the ram turns fast the thread of the valve spool actuator.

This manually operated press is reported to be especially suited to straightening operations, as the operator has complete control of ram speed, travel, distance and tonnage imposed on the work.

Circle 254 on postcard for more data



H-P-M servo-controlled C-press



Cleveland Model LH14-14 hydraulic press brake with 14 in. stroke length

THE CLEVELAND CRANE & ENGINEERING CO.

PRESS BRAKE — This machine, Model LH14-14, will accommodate mild steel plate up to 20 ft by 5/16 in. The ram is driven by two hydraulic cylinders and is kept level by electronic control. If desired, it can be tapered. Also, it may be reversed at any point in the stroke.

The entire power package—the oil

reservoir, pump, motor, valves, and gages—is mounted at the top of the machine and can be removed and handled as a unit. The machine cannot be damaged by overloading because of the hydraulic design which stops the ram without harm. It can be backed away immediately.

Circle 256 on postcard for more data

Forming Equipment



Grotnes s Model 8-H-60-25 self-contained expander for forming electric motor shells. The head is equipped with 12 jaws with removable wear shoes. Lubrication and loading are automatic.

GROTNESS MACHINE WORKS

SELF-CONTAINED EXPANDER—Designed specifically to form and size electric motor shells in several sizes, the mobile feature of this expander provides the user with maximum efficiency, since it can be moved from one line to another as needed, without any loss of the accuracy and precision that is required for the production of quality products. This feature makes the portable self-contained expander a versatile tool.

Named Model 8-H-60-25, the unit is self-contained and requires only a connection to an external electric power source to operate. The machine develops a drawbar pull of 25 tons, and with modification of the hydraulic system and drawbar design will develop 60 tons. The 25 ton model, with the head shown, will handle parts within the following range: Inside diameter of from 3½ to 16 in., mild steel, maximum height of 8 in.

Circle 258 on postcard for more data

Ajax forging machine equipped with an automatic feed mechanism

THE AJAX MFG. CO.

FORGING UNIT—This Ajax 1½ in. forging machine is equipped with a feed mechanism which transfers the blanks automatically from the loading chute and down through the forging operations.

Various lengths of blanks can be fed into the machine. The blank is heated only on the end to be upset, and is lowered through the die operations in the throat of the machine by means of air actuated grips. The blank is rotated between operations to assure uniform heading. Production is continuous, heading a bolt in two operations and completing a finished forging with every stroke.

Circle 257 on postcard for more data

HANNIFIN CO.

HYDRAULIC BENCH PRESS—Dual hand and adjustable downstroke controls are standard on a line of 6 and 8 ton high speed hydraulic bench presses designed for forming, trimming and force-fit assembly operations.

The presses stand 55 in, above the bench surface and are mounted on a 19 by 38 in, base plate. They have a 12 in, stroke; 8 in, reach from throat



Hannifin high-speed, hydraulic bench press

of frame to centerline of ram, and 18 in. gap. They can be supplied with an index table for automatic operation.

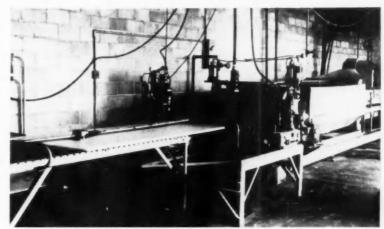
Circle 259 on postcard for more data

WESTINGHOUSE ELECTRIC CORP.

PLATE EXTRUDER — Equipment for the automatic, uninterrupted extrusion of 48 in. polyethylene plate in thickness up to 1\% in. has been designed and built by Westinghouse.

In providing sheet polyethylene, this extrusion equipment will aid the further development of nuclear reactors, since polyethylene can be used where the excessive weight of concrete limits its shielding application. Polyethylene plate exhibits excellent neutron shielding capacity and is used for neutron shielding protection on nuclear reactors where weight and space limitations are a primary consideration.

Circle 260 on postcard for more data



Westinghouse continuous polyethylene plate extruder

THE LODGE & SHIPLEY CO.

METALWORKING PROCESS—A metalworking process for forming tall, shell-type cylindrical parts has been developed.

Known as "Flo-Reforming," the process is based on the use of a Floturn machine plus one or more "Reforming" operations performed on a press, using Reform tools.

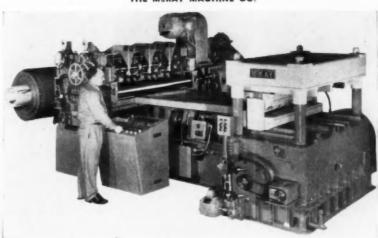
A typical example of the process is the production of 500 stainless steel shells, three inches OD by 7.125 in. deep with a 0.042 in. wall thickness. In producing this part, the



Lodge & Shipley metalworking process

process starts with a 6-7/16 in. round blank, including 1/2 in. trim allowance, 0.125 in. thick. Using a No. 12 vertical Floturn machine, the blank is formed into a truncated cone which is washed and annealed and then Re-

THE MCKAY MACHINE CO.



DIE SHEAR LINE—The McKaymatic die shear line is applicable for use wherever sheet metal is used. Flexibility offered by the electronic control makes changing of length of cut an instantaneous operation.

Circle 261 on postcard for more data

formed into the straight-side cylinder by a single Reform operation.

Circle 262 on postcard for more data

AMERICAN BRAKE SHOE CO.

HYDRAULIC PRESS—A line of compacting multipresses provides automatic, precise control of every individual phase in compacting and pelleting operations. Designed to meet the requirements of those industries compacting powdered materials, the

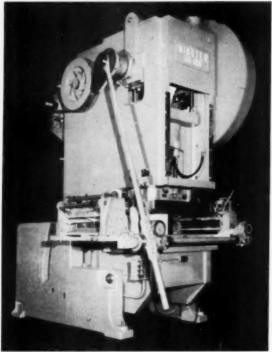
basic unit of the press is composed of four major components: a standard multipress ranging from 5 through 75 ton floor models to 2 through 10 ton bench models, a shuttle feed unit, an individually powered and synchronized ejection ram and a control system.

Single lever control of the press permits either single or automatic cycling of the press ram. Also allows an emergency reverse position, a holddown position for locating tooling and a neutral or idling position.

Circle 263 on postcard for more data

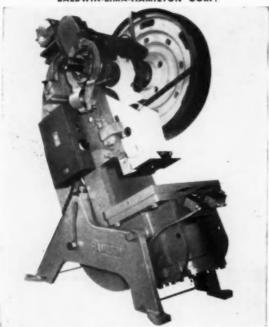
Forming Equipment

THE MINSTER MACHINE CO.



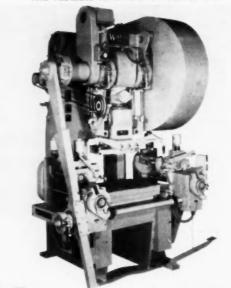
SINGLE POINT GAP PRESS—Series G1 single point gap presses, in capacities ranging from 75 through 250 tons, can be equipped with either single or double roll feed equipment Circle 264 on postcard for more data

BALDWIN-LIMA-HAMILTON CORP.



INCLINABLE PRESS-Shown is the 75 ton open back inclinable press developed for high speed production of small stampings. Features of the press include a steel frame, and disk type clutch Circle 265 on postcard for more data

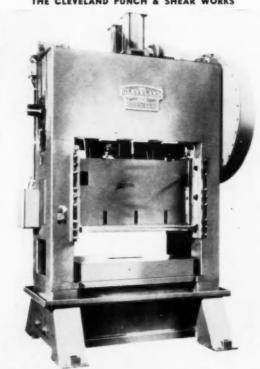
THE FEDERAL MACHINE & WELDER CO.



OPEN BACK GAP PRESS-This Warco No. 60-1-14CG welded steel open back, single crank, flywheel type gap press, in 60 ton capacity operates at speeds from 75 to 200 spm. Maximum teeding speed is 1200 rpm. Feed length is 0 to 12 in. and the feed shown is a double roll type.

Circle 266 on postcard for more data

THE CLEVELAND PUNCH & SHEAR WORKS



DOUBLE ECCENTRIC PRESS—High-speed uninterrupted production is made possible with this press having a capacity of 200 tons.

Operating at a speed of 50 to 150 fpm, the unit has a bed area of 36 by 54 in.

Circle 267 on postcard for more data



These Clearing Torc-Pac Presses at Amphenol-Borg have something you should know about

If you operate presses, you know that clutch and brake maintenance can be at least an annoyance—at worst; a stumbling block in your entire production schedule.

With that fact in mind, consider these Clearing Torc-Pacs which have been helping the Amphenol Connector Division of Amphenol-Borg meet tight production schedules on classified government work. They are certainly clean looking presses. There are no overhanging gears or flywheels so that there is a maximum amount of floor space for easy material handling.

But what you can't see is that the drives are sealed. That's right, sealed—a point that demonstrates the trouble free character of these presses.

CLEARING GUARANTEES THE DRIVE OF TORC-PAC PRESSES FOR 18 MONTHS IF THE SEAL HASN'T BEEN TAMPERED WITH

There are a great many more plus features about the Clearing Torc-Pac. Write for free descriptive literature.

Clearing division of U. S. Industries, Inc. manufactures power presses of all types, Clearing-Axelson and Clearing-Harrison lathes, dies and special tooling, and special equipment for the aircraft and missile industry.



Would any other press manufacturer dare to seal their press drives in this manner? Find out about the remarkable Torc-Pac and how Clearing can actually seal the drive.

Write for further engineering facts on Clearing's line of Torc-Pac O.B.I.'s.





DIVISION OF U.S. INDUSTRIES, INC. 6499 W. 65th Street, Chicago 38, Illinois



NE important feature of automatic production is the sterage of shape in dies. This is also the basis of closed die forging—"drop forging". Chambersburg, pioneer builder of equipment for making drop forgings, today builds tools that will shape forgeable materials to close tolerances by a combination of carefully designed die configurations, with

precisely controlled forging blows and a fixed pattern of mechanized stock manipulation. When used with complementary shearing, heating, and trimming equipment, fully automatic or semi-automatic production lines are created which are capable of increased output at lower costs.

CHAMBERSBURG ENGINEERING CO.
CHAMBERSBURG • PENNSYLVANIA

A new publication, "The Automatic Production of Forgings in Closed Dies" provides the latest information on bow to adapt these new developments to your drop forging operations. Write today for Bulletin 87-L-9.

CHAMBERSBURG

"THE HAMMER BUILDERS"

Designers and Manufacturers of

THE IMPACTER

Processing Equipment SECTION

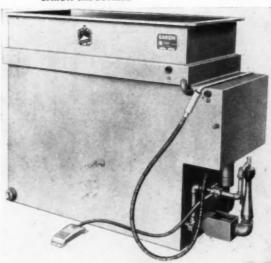
COATING HEAT TREATING PAINTING PLATING CLEANING

FOR ADDITIONAL INFORMATION please use reply card at Back of Issue

BARON INDUSTRIES

VAPOR SPRAY DE-GREASERS-"Baronet" standard vapor spray degreasers are designed to meet industrial requirements for an efficient metal cleaning machine. The series consists of 5 models with interiors ranging from 3 to 8 ft length, while the inside depth and width of each is 24 by 24 in. The units use a trichlorethylene vapor solution to dissolve greases, oils and waxes from all ferrous and non ferrous metals. Cleaning and drying by vapor condensation and a hand spray rinse is accomplished in seconds.

Circle 268 on postcard for more data



METAL & THERMIT CORP.

PLATING BARREL—A completely automatic continuous chromium plating barrel has been designed for ease of operation. The device needs attention only for feeding parts and for the removal of plated parts from a tote box.

It is designed so that dry and burnished parts are put into one end of the machine and are fed automatically into the plating barrel which has specially designed baffles to assure plating without contact marks. Timing is automatic and can be adjusted for thickness of plate desired and number of parts being plated at any time.

Circle 269 on postcard for more data

CONSOLIDATED ELECTRODYNAMICS CORP.

VACUUM COATER—A 72 in. vacuum coater with six stations which hold work pieces up to 22 by 50 in., named LCI-72, assures the operator of full capacity production loads in metallizing larger items. A complete cycle, from inserting the work pieces into the vacuum chamber to removal of the coated item, can be made with polystyrene work pieces in nine min-

Circle 270 on postcard for more data

KING-SEELEY CORP.

PORTABLE BARREL FINISHER— A portable deburring and finishing barrel, said to be suited for laboratories, research and development departments and manufacturers with limited finishing needs, has been designed.

Called the Model DMB-10 "Super-Mite," the unit will speedily debur and finish parts having close tolerance radii and low micro-inch surface finishes.

The 12 in. diameter by 8 in. wide barrel has a ½ cu-ft capacity, and is equipped with a quick acting cam type door. It is driven at speeds variable from 19 to 38 rpm by a 1/6 hp, 110 v motor. The machine has a startstop switch, an 8 ft cord and a belt safety guard.

Circle 271 on postcard for more data



Almco small, partable deburring and finishing barrel

Processing Equipment

LINDBERG ENGINEERING CO.



BOX FURNACE-The Type RD8-47 non-atmophere box furnace has been designed to operate to 2250 F. through the use of a high temperature alloy heating element. The furnace chamber is 5% in high, 141/4 in. deep. and 81/2 in. wide. A metallic packing, recessed in the face of the door, eliminates brick to brick contact thereby minimizing dusting and heat loss. An atmosphere retort, with a work area of 4¾ in. high, 73/4 in. wide, and 13% in. deep is available as an accessory.

Circle 272 on postcard for more data

WHEELABRATOR CORP.

BLAST CLEANING CABINETS— Spinner hanger cabinets are designed to meet the needs of specific cleaning applications but their essential features include compartmented work areas, spinner devices for rotating the work while it is being blasted, airless blast units, and work-carrying fixtures.

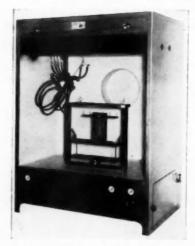
Indexing arrangements turn the compartments so that one is always exposed to the operator for loading and unloading. Blasting can be achieved in one or several stages, depending on requirements, and is continuous in operation. The size of the machine can be varied to handle virtualy any sized part.

Circle 274 on postcard for more data

CONFORMING MATRIX CORP.

AUTOMATIC SPRAY MACHINE— An automatic spray machine which paints one, two, or three surfaces of generally oval or rectangular shaped pieces of varying length, where fine mask definition and paint demarcation are required, has been developed.

A device which embodies a foreshortened pivoting action permits tilting of the overhead traveling guns in



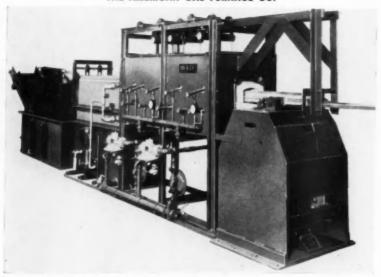
Model SVF automatic spray machine

one or two directions as well as painting in both directions when the part is in painting position.

Standard gun mounting rods may be employed on this single vertical fixture machine, which is named Model SVF. The square shaft vertical fixtures alternately lower and raise the part, placing it snugly in the mask for painting. The fixtures are adjustable so as to paint a wide range of different sized parts.

Circle 275 on postcard for more data

THE AMERICAN GAS FURNACE CO.



RECIPROCATING FURNACE—The Model 264 reciprocating furnace is designed for bright annealing and bright hardening of small stainless steel parts at temperatures up to 1900 F. The unit shown has a capacity of approximately 600 parts per hour.

Circle 273 on postcard for more data

WALL COLMONOY CORP.

DRY HYDROGEN FURNACE— This giant dry hydrogen furnace permits vertical brazing of assemblies up to 10 ft long and up to 6 ft in diameter. The instrument controlled unit is available for controlled atmosphere brazing, heat treating and annealing. It can be used with pure dry hydrogen, argon, carbon dioxide, nitrogen or exothermic atmospheres. Usable



Wall Colmonoy dry hydrogen furnace

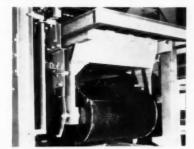
working height is 120 in. and the furnace can accept parts up to 72 in. in diameter. Maximum operating temperature is 2250 F; control of temperature over the entire 10 ft height is accurate within plus or minus 25 F.

Circle 276 on postcard for more data

HANSON-VAN WINKLE-MUNNING CO.

PROCESSING BARREL—The horizontal barrel door seen on this processing barrel opens and closes automatically. The barrel is designed for cleaning, phosphating, blackening, Lubrite, Bonderizing, chromate treatments, pickling and similar processing.

After the barrel is loaded, a signal starts it rotating. Rotation actuates the mechanism that closes the door, which is held secure by a detent



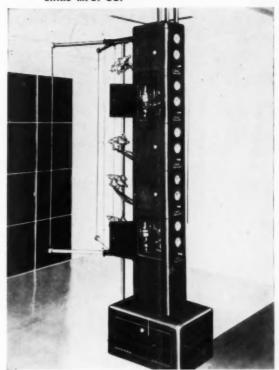
Hanson-Van Winkle-Munning processing

spring while the barrel passes through the treatment cycle. On completion of the treatment, barrel rotation is reversed to open the door and discharge the load.

Circle 277 on postcard for more data

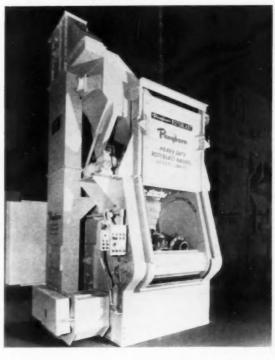
BINKS MFG. CO.

SPRAY PAINTING
SYSTEM — Pictured is
the Binks modular electrostatic spray painting system which is designed to meet requirements for many spray
painting applications.
The system produces
charged particles of
paint which are attracted to the item to
be coated without unnecessary overspray.
Circle 278 on postcard
for more data



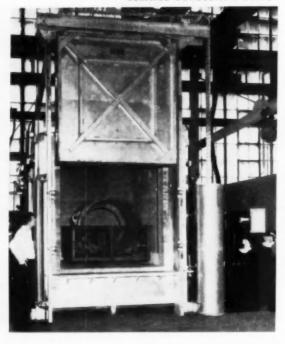
PANGBORN CORF.

HEAVY DUTY BAR-REL - This Pangborn heavy duty 20 cubicfoot Rotoblast barrel is designed to increase production and lower production costs while maintaining high cleaning efficiency. The barrel, named Type 20 GN, features a 30 hp motor which allows the wheel to throw 50,000 lb of abrasive per hour for rapid blast cleaning. The extra-heavy work conveyor allows loads up to 3500 lb. with single pieces, weighing up to 800 lb each, to be handled in the machine. A quick-acting work loader, with double cables for safety, delivers each chine. Control is from a panel mounted alongside the cleaning chamber opening. Circle 279 on postcard for more data



Processing Equipment

SURFACE COMBUSTION CORP.



HEAT TREAT FUR-NACE - This large oven furnace eliminates production problems by performing many different heat treat cycles and accommodating a variety of part sizes to be heat treated. Operating range of the furnace is 600 to 2000 Large weldments, forgings, castings and shafts 63 in. long handled in an upright position are easily processed in this unit. which heat treats 7500 16 loads.

Circle 280 on postcard for more data like automatic spray machines, paint heaters and multi-station systems has been designed.

The units are available in 2, 5, 10 and 15 gal sizes and will clean hose, heater coils and flush spray guns in a single operation with a minimum amount of solvent. The cleaners consist of a pressure feed tank shell, lid assembly, safety valve, and a triple action cleaner and mixer assembly. The mixer assembly has two metering valves, one for air and one for cleaning solution.

Circle 282 on postcard for more data

LINDBERG ENGINEERING CO.

HIGH TEMPERATURE FURNACE
—This high temperature atmosphere
box furnace is designed for heavy
and continuous duty at all heat levels
up to 2500 F and for short or intermittent runs to 2700 F. Heating ele-



Lindberg Type GB-50 box furnace

ments are of the non-metallic silicone carbide type. Working area is 6 in. wide by 12 in. deep by 5 in. high. Circle 283 on postcard for more data

TOBIN-ARP MFG. CORP.

WET BLASTER—Called "Liqui-Breez," Model LB-1002, a unit has been designed to perform honing, cleaning, deburring and blending operations.

In cleaning, the unit removes all minute particles and foreign matter from metal surfaces. In deburring, both loose and tight burrs are successfully removed, and in honing the cutting efficiency of high-speed steel and tungsten-carbide cutting tools can be greatly increased.

Circle 284 on postcard for more data

THE SENTRY CO.



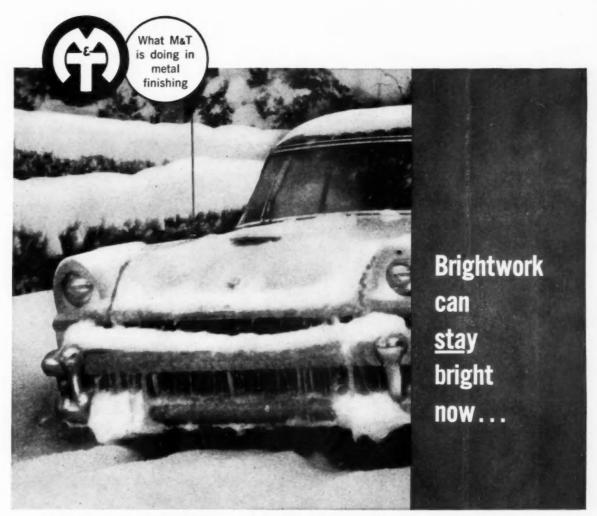
ELECTRIC FURNACE—With proper automatic temperature control equipment, a temperature range of 300 to 2500 F is available from this turnace, making it suitable for general purpose heat treating.

Circle 281 on postcard for more data

THE DE VILBISS CO.

CLEANING EQUIPMENT — Large capacity equipment for flushing and

cleaning out paint passages and hose lines in complex finishing equipment



New M&T Chromium Plating Discovery offers most economical way to improve durability

Durability of chromium plated parts in severe, accelerated corrosion tests has been increased up to 500% by the revolutionary Unichrome "Duplex Chromium" Plating Process developed by Metal & Thermit.

Using M&T "Duplex Chromium" to increase the thickness of chromium approximately five times from the usual average of 10 millionths of an inchenables parts to maintain an ASTM durability rating of 8 or better (10 is perfect)! This thicker and more uniform chromium plate radically increases survival time in modern accelerated tests by many times over.

M&T "Duplex Chromium" consists of a layer of Unichrome Crack-Free Chromium which blocks infiltration of corrosives to underlying metal. It is followed by another layer of Unichrome SRHS* Chromium to build up proper thickness. The additional millionths of an inch more chromium, in these two layers, do more for outdoor durability than any

other change in present plating procedure. Results show that per dollar invested in equipment and solutions, this new technique gives greater benefits than a corresponding expenditure for thicker copper and nickel undercoats. It saves on capital investment because existing production equipment can be used. It saves by cutting rejects of parts which are now required to survive more rigorous life tests than heretofore.

Simply by adding the few additional minutes to plating time and using M&T "Duplex Chromium", you can add *years* to the life of chromium plated finishes in outdoor exposure. Send for data. Or ask the M&T Man about it.

METAL & THERMIT

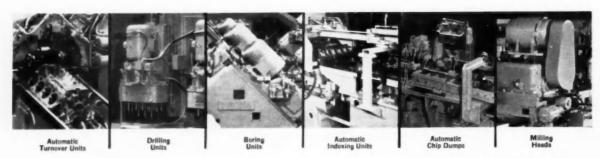
CORPORATION

GENERAL OFFICES: RAHWAY, NEW JERSEY

For economical, volume production of parts like these...



Get your best machine buy after a Sundstrand "Engineered Production Analysis" Whether the job calls for milling, turning, boring, drilling, or any combination of these and any other operations, a Sundstrand "Engineered Production" analysis assures the most efficient processing method. Standard components like those shown below reduce original investment.



"Engineered Production" Service



Sundstrand solutions include many years of experience with all three basic types of process machines: (1) Work transfer where work progresses from one station to the next and is located in another fixture, (2) pallet type where work and fixture move together, and (3) indexing or dial type consisting of an indexing rotary table and enough machining stations for the required operations.

Factors considered as part of a Sundstrand "Engineered Production" analysis that determine the best type of machine for the job include: Hourly and total production required, shape of the part, material composition, required locating points, and numerous related factors.

Broad use of standard components in designing special machines provides two outstanding benefits: (1) Lower initial capital equipment outlays and (2) simpler, lower cost modification when change occurs in parts being processed.

Processing lines built by Sundstrand offer from less than 10 to more than 40 separate work stations with multiple operations being performed at many stations. Brief descriptions of these typical solutions are contained in a booklet available from Sundstrand. Parts being processed include cylinder blocks, crankshafts, camshafts, electric motor frames, transmission housings, and brake drums.

For more details on how Sundstrand applies "Engineered Production" solutions to insure the best machining method write for Bulletin 207.



HERE ARE TYPICAL SUNDSTRAND SOLUTIONS



SUNDSTRAND

More facts about SUNDSTRAND

"Engineered Production"

Literature listed under various machine types has more details. Write Sundstrand for your copy today.



Automatic and Tracer Lather Bulletin A-107



Engineered Milling Production Bulletin B-107



Examples of Transfer Machines—Bulletin C-107



Multiple-spindle Drilling Machines-Bulletin D-10



Internal and Rotary Surface Grinders—Bulletin E-107



Broaching Tools Bulletin F-107



Practical Broaching Methods Bulletin F-107



Thread Milling Bulletin G-107

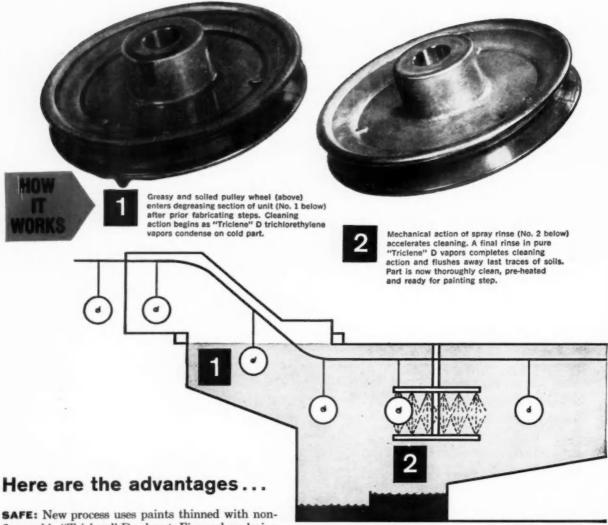
SUNDSTRAND MACHINE TOOL

DIVISION OF SUNDSTRAND CORPORATION

BELVIDERE, ILLINOIS

A new process from Du Pont...

Vapor degreasing and in one compact unit—with



SAFE: New process uses paints thinned with non-flammable "Triclene" D solvent. Fire and explosion hazard virtually eliminated!

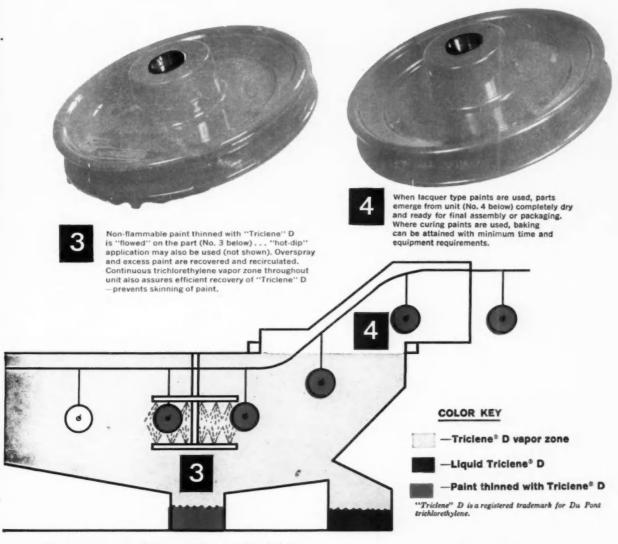
cuts costs: Solvent, overspray and excess paint are fully recovered—drip loss is eliminated. Integrated cleaning and painting with "Triclene" D trichlorethylene cuts labor and utility costs.

ONE COMPACT UNIT: Simplified equipment saves floor space and reduces finishing time. Unit can be easily adapted to fit in with other production steps both before and after cleaning/painting.

LOW INVESTMENT: No drip pans or spray booths needed. Drying ovens can be eliminated or requirements minimized.

choice of flow coating or dipping: "Flowon" application of paints (illustrated) or a "hot-dip" method is available. Du Pont Technical Representatives can help you fit integrated cleaning and painting to your operation.

nonflammable painting Triclene® D trichlorethylene



Technical Report available...

Du Pont has prepared a Technical Report describing its new process for integrated cleaning and painting. Included are cost comparisons to help you determine probable cost savings. Get a copy of this Report from your Du Pont representative or your distributor of "Triclene" D trichlorethylene. You can also write to Du Pont, Electrochemicals Dept., Wilmington, Del.



BETTER THINGS FOR BETTER LIVING . . . THROUGH CHEMISTRY

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Automation and Material Handling SECTION

INDUSTRIAL TRUCKS
TRANSFER UNITS
CONTROLS
FEEDING DEVICES
LOADERS
UNLOADERS

FOR ADDITIONAL INFORMATION please use reply card at Back of Issue

FOSDICK MACHINE TOOL CO.

MEMORY SYSTEM — The Fosdick memory system for numerically controlled machines uses two cross-bar switches to store all the information needed to control spindle feeds and speeds, and two axes of table movement. Designed for use with preci-

sion boring machines, the system uses a third cross-bar switch to handle depth control and tool designations; a fourth for automatic tool changing. Five such switches are easily housed in the standard control and tape reader console furnished with Fosdick



Fosdick precision boring machine featuring new tape controlled numerical memory

numerically controlled jig borers. No additional cabinets are required.

The system is entirely electromechanical, with a bank of sealed relays and a couple of stepping switches (also housed in the control console) the only moving parts of the system.

Circle 285 on postcard for more data

WALTER P. HILL, INC.

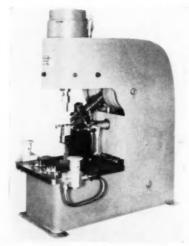
AUTOMATIC TRANSFER UNIT— An automatic, double-end transfer machine that can perform up to six metal forming operations at high production rates on each end of tubular or solid round stock has been announced.

It will handle stock up to two inches diameter and will cycle at a maximum rate of 3600 pieces per hour. Stock is fed to the machine conveyor from a magazine or factory conveyor, carried through the machining or forming stations by the transfer mechanism and deposited on either exit conveyor or tote box.

Circle 286 on postcard for more data

HABERSTUMP-HARRIS, INC.

PARTS FEEDER, DRIVER — The advantages of automatic feeding of small production parts and the convenience of a bench type driver are combined in the Hopperal driver. The Hopperal small parts feeder has been built into the driver frame and pro-



Hopperal driver for small parts

vides a continuous supply of parts for the assembly operation without overfeeding and back pressure. The unit will feed screws, nuts, bolts, rivets, nails and many other fastening devices.

Circle 287 on postcard for more data

FEEDALL. INC.

HEADED PARTS FEEDER—Automatic and continuous feed, transfer or assembly of headed parts are provided by the Model 700 Feedall. It has electric control with variable speed from 10 to 20 strokes per minute. The machine feeds sliding parts ½ to 1 in. in diameter from 1 to 4 in. long; headed work, same diameters, ½ to 3 in. long. The hopper capacity is 1½ cu-ft.

Measuring 18 by 28 in. overall and 19 in. high, the unit is readily portable and power is entirely self-contained. It uses a ¼ hp 220/440 v 3-phase motor. An overload safety system is built-in to protect moving parts from damage.

Circle 288 on postcard for more data

BINKS MFG. CO.

MATERIAL HANDLING PUMPS—A line of material handling pumps called the Pacer Series represents a line of pumps that will handle virtually any job calling for the use of heavy materials, paints and buffing compounds.

Pacer 25 is 2½ to 1 ratio and will handle medium heavy materials from buffing compounds to automobile sound deadeners.

Pacer 40 and 60 are designed to handle heavy materials such as cold process roofing, sound deadening material, mastic, etc. Featuring a 4 to 1 and 6 to 1 ratio respectively, both are double acting to deliver material on both the up or down stroke. At 10 cycles, Pacer pumps will deliver five quarts or 1.25 gpm. At 20 cycles delivery is 2.5 gpm.

Circle 289 on postcard for more data

CLEVELAND PNEUMATIC

STOCK FEED UNIT — Hand-fed punch press jobs can be converted to safe, fast automatic feeding with the Renco-Aire portable, air-operated stock feed. Incorporating the patented Micro Valve control, the unit can be mounted in minutes without links or rods.

Four standard sizes are available for use with almost any hand-fed punch press, and can be shifted from one machine to another as job requirements change.

The press feed is entirely air operated. No electrical connections are required.

Circle 290 on postcard for more data



Yale & Towne G-5 Series 15,000 to 20,000 lb capacity lift truck especially designed for high capacity materials handling in metals manufacturing

THE YALE & TOWNE MFG. CO.

INDUSTRIAL LIFT TRUCKS—The G-5 line of high capacity, solid tire, gasoline or LP-Gas powered industrial lift trucks is built with four side thrust rollers to minimize friction due to off center loading.

The nested channel assembly of the truck uses an 11 in. wide outer section and a 9 in. wide inner section. Weight of the load is placed directly onto a planetary drive axle. Channel

rollers are located at the bottom of the moving channels and the top of the stationary channels giving the largest possible roller spacing at every height or lift.

Standard hydraulic tilt on the G-5 series is 10 degrees back and 6 degrees forward for safety nesting loads in transit and ease of load placement.

Circle 291 on postcard for more data

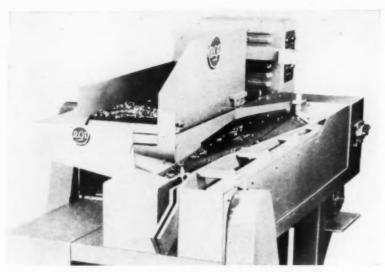
HYSTER CO.

PNEUMATIC TIRE LIFT TRUCKS—Dependable power for big truck operation is supplied by 6-cylinder Continental engines in a line of heavy - duty pneumatic tire lift trucks. The power plant develops 153 hp at 2400 rpm, 350 lb-ft of torque. The units, the Challenger 360 and 400, are rated at 36,000 and 40,000 lb capacity at a 36 in. load center. The threespeed range, power shifted, planetary transmission with in tegral torque converter provides fast, smooth load control. Circle 292 on postcard





Automation and Material Handling Equipment



RCA Model 330-NM non-mar feeder for handling fragile, highly finished parts

RADIO CORP. OF AMERICA

NON-MAR FEEDER—Model 330-NM non-mar feeder automatically orients and feeds such parts as wrist pins, hydraulic valves and plungers, bearings, glass or ceramic insulators at speeds of up to 30,000 pieces per hour. Parts handled can be flat, round disks or rings, cylindrical or rectangular in shape.

Demand feed control assures smooth continuous flow of parts to the equipment being fed, whether single or multiple.

Circle 293 on postcard for more data

Clark medium-lift platform truck for lifting and hauling skids will lift 4000 lb

CLARK EQUIPMENT CO.

M E D I U M - LIFT P L A T F O R M TRUCK—This medium-lift platform truck has been developed for lifting and hauling skids. The standard model is capable of lifting 4000 lb and maximum lifting height is 21 in. The skidcarrying platform is 26 in. wide and is available in lengths of 36 to 60 in., in six inch increments.

Forward and reverse direction is controlled by a butterfly switch in the control head on the steering handle. Electric switches make it impossible to direct both forward and reverse current to the drive motor at the same time. The steering handle turns 90 degrees in each direction. Brakes are automatically applied when the steering handle is in either the vertical or horizontal position, and the handle returns to vertical position when released by the operator.

Circle 294 on postcard for more data

THE ELWELL-PARKER ELECTRIC CO.



ELECTRIC LIFT TRUCKS—A line of electric powered lift trucks having capacities of 2000. and 3000 lb has been designed. The trucks feature a special low height operator seat for maximum safety in low head room areas. They can make a right furn in a 58 in. wide aisle; also, the trucks can right angle stack in a 1091/4 in. wide aisle.

Circle 295 on postcard for more data

SAHLIN ENGINEERING CO.



HORIZONTAL UNLOADERS—Pictured is a small compact horizontal unloader recently added to the Sahlin line of press automation equipment. The jaw components are interchangeable with standard Saplin hand jaws.

Circle 296 on postcard for more data

BENDIX AVIATION CORP.



TAPE SEARCH—This Bendix tape search feature shown mounted on a Bendix machine control unit provides automatic selection of up to 100 specific parts sequenced on one reel of tape, selection of up to 100 part reference points during the machining of a specific part and up to 80 auxiliary on-off control functions. (Industrial Controls Section, Bendix Aviation Corp.)

Circle 297 on postcard for more data

PRESS AUTOMATION SYSTEMS, INC.

AUTOMATION UNIT - This versatile automation unit converts any single-action press into a transfer feed press. Called the Trans-Feed, the unit will feed strip stock or parts into and out of press die areas automatically. It can feed material between dies in a press or transfer and feed two or more presses in a line.

The PAS Trans-Feed bolts on the press bolster plate and can be moved from one press to another to provide automation for job-lot pressroom operations. Cast aluminum construction reduces weight and inertia forces of the unit

All JIC standard electric controls for the Trans-Feed cycle are enclosed in a push-button panel on the side. A plug in the side of the panel permits the press controls to be tied in electrically with the Trans-Feed and cause it to operate in sequence with the press.

Circle 298 on postcard for more data

BALDWIN-LIMA-HAMILTON CORP.

MOBILE HYDRAULIC CRANE -The Model 410 is a mobile, self-propelled hydraulic crane which operates in the 10-ton range. It has a telescoping, hydraulically operated boom which extends horizontally to 25 ft, retracts to 15, and swings through full circles without limit stops. It also tilts upward to 60 degrees from hori-

Manual boom extensions, cabs and other accessories are available. The self-propelled chassis features frontand-rear end steering and torque converter drive. Hydraulically operated outriggers are optional.

Circle 222 on postcard for more data

TECHNICAL DESIGN & DEVELOP-MENT CORP.

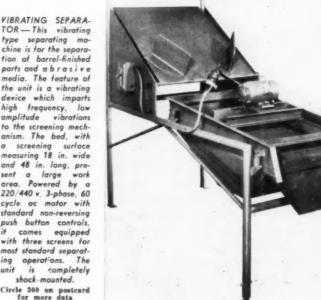
STRIP STOCK FEEDERS-A series of automatic strip stock feeders designed for the blanking of hot or cold phenolics, fibre, hard rubber and compositions has been announced.

The machines attach directly to the bolster plate of any standard blanking press and automatically feed strip stock material from a magazine on top of the machine, through a heated oven and into a roll feed, then into the blanking die. The entire machine is synchronized with and driven by an adjustable cam mounted on the end of the press crankshaft with a connecting rod to the roll feed.

Designated Series 65, the units can handle strip stock from 1/2 to 61/2 in, wide,

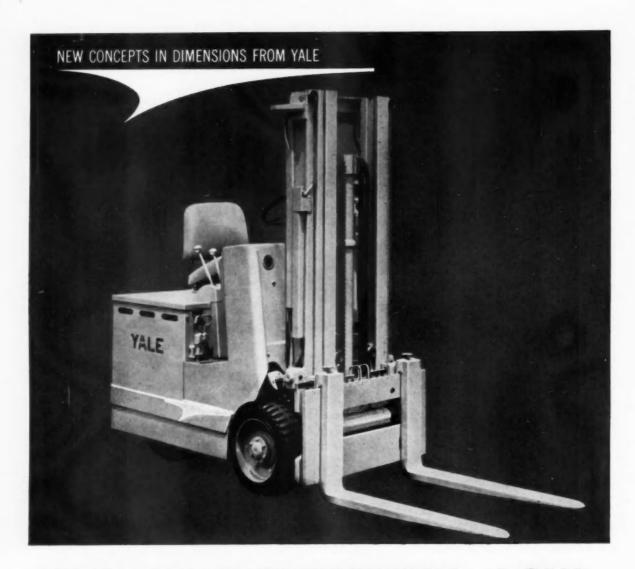
Circle 299 on postcard for more data

ROTO-FINISH CO.



chine is for the separation of barrel-finished parts and a brasive media. The feature of the unit is a vibrating device which imparts high frequency. amplitude vibrations to the screening mechanism. The bed, with a screening surface measuring 18 in. wide and 48 in. long, present a large work area. Powered by a 220/440 v. 3-phase, 60 cycle ac motor with standard non-reversing push button controls, comes equipped with three screens for most standard separating operations. The shock-mounted.

Circle 300 on postcard for more data



NEW YALE ELECTRICS · LOW · SPEEDY · MANEUVERABLE

Mechanically actuated carbon pile for smooth speed control...produces infinite motor speeds to suit any operation cycle. Dual caster wheels mounted on ball bearings provide easy steering. Short turning radius. 71" height Triplex Mast available to give 144" fork height. Other features: hydraulic wheel brakes, removable battery box, H-I single lever control for multiple function attachments. Capacities: 2,000, 3,000 lbs. For full information, contact your Yale representative or write The Yale & Towne Manufacturing Co., Materials Handling Division, Philadelphia 15, Pa., Dept. KT4-V.

YALE

INDUSTRIAL LIFT TRUCKS
TRACTOR SHOVELS · HOISTS

YALE & TOWNE

Yale Materials Handling Division, a division of The Yale & Towne Manufacturing Company. Manufacturing Plants: Philadelphia, Pa., San Leandro, Calif., Forrest City, Ark.

Products: Gasoline, Electric, Diesel and LP-Gas Industrial Lift Trucks • Worksavers • Warehousers • Hand Trucks • Industrial Tractor Shovels • Hand, Air and Electric Hoists



FOR ADDITIONAL INFORMATION please use reply card at Back of Issue

NATIONAL BROACH & MACHINE CO.

GEAR GAGING, SORTING UNIT— This pedestal-mounted Red Ring automatic gear gaging and sorting machine will check the accuracy of gears with large integral flanges produced by hobbing, shaping or shaving operations. It inspects unwieldy gears hav-



Red Ring gear gaging, sorting machine.

ing integral flanges which cannot be fed through conventional feed chutes.

The flanged gear rolls through the gage on a guide rail that supports the gear on the hub surface between the gear and the flange. Another guide rail behind the gear bears on the flange surface and keeps the gear upright until it is engaged by the master gear.

Circle 301 on postcard for more data

KUEFFEL & ESSER CO.

TILT ANGLE TRANSDUCER—An optical-electronic device has been developed which is capable of automatically detecting and recording angular change to within ¼-second of an arc. Called the Electronic Tilt Angle Transducer, the instrument can be used to measure positional disturbances of structures such as guided missile launching platforms and radar tracking systems.

Used on a launching platform, the disturbance signal from the instrument can be fed directly into a servo-mechanism to make the platform self-leveling. In addition, the signal can be applied to a chart recorder to graphically illustrate the science of angular measurement.

Circle 302 on postcard for more data

BRANSON INSTRUMENTS, INC.

THICKNESS TESTER — Weighing less than five pounds, the Model 6 Audigage is used for nondestructive thickness measurement of metals, glass, ceramics, and plastics from one side.

When a high-sensitivity ceramic transducer is applied to one surface of the material under test, the instrument indicates harmonic resonances by an audible signal in the headphones and by deflection of a small indicator. Simultaneous computation and conversion of these resonance frequencies to thickness is registered on a panel meter.

The unit may be used on any flat, cylindrical, or compound-curved surface, down to a one inch radius, using the standard transducer provided. Different transducer mountings are available for measuring smaller pipe or tubing, and for measuring thickness from concave surfaces.

Circle 303 on postcard for more data

STEEL CITY TESTING MACHINES, INC.

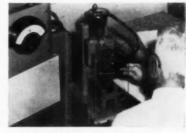
TENSILE TESTERS—A family of portable tensile testers has been developed for many quality control applications. These testers are not dependent on outside power of any kind, since the load is applied manually by rotating a knurled knob. They weigh only 36 lb, and the applied load is measured by a trapped oil system.

Circle 304 on postcard for more data

FEDERAL PRODUCTS CORP.

GAGE BLOCK COMPARATOR—An electronic comparator, capable of detecting dimensional variations of one-millionth of an inch, has been designed.

The comparator, known as Model 130 B-12, can accurately measure gage blocks as large as four inches. Its electronic amplifier provides four magnifications.



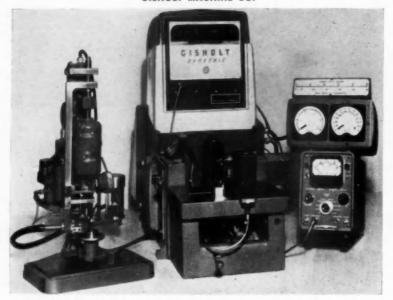
Federal Model 130 B-12 comparator

The gage head is mounted in V-ways and is supported on a substantial base to eliminate danger of deflection. The gaging spindle itself is mounted on reed pantograph springs rather than in bushings to provide frictionless movement and to operate with very light gaging pressure so as not to mar highly polished surfaces. Fine adjustment is accomplished electrically.

Circle 305 on postcard for more data

Quality Control Equipment

GISHOLT MACHINE CO.



Gishalt HS-1 bench-type balancer designed to handle miniature belt, air, or electrically self-driven parts or assemblies

BENCH-TYPE BALANCER — This Gisholt HS-1 balancer is set up to balance an electrically self-driven missile gyro. Optional photocell, below the workpiece, measures the angle of unbalance in relation to a single reference line on the rotor. Meters at the top right indicate unbalance amount and angle; the expanded scale tachometer at the lower right indicates rotational speed. Corrections are made

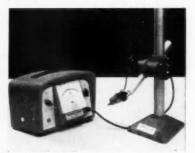
on the drill press shown at the left of the above picture.

Regardless of workpiece weight or method of drive, unbalance can be measured and located to full machine accuracy (0.000002 in. bearing displacement) in two transverse planes, as little as ½ in. apart. Unbalance indications in one plane are unaffected by unbalance in the other.

Circle 306 on postcard for more data

THE PRATT & WHITNEY CO., INC.

TRANSISTORIZED GAGES—A line of measuring instruments called Trans-O-Limit Gages features completely transistorized circuits and four



Pratt & Whitney Trans-O-Limit height gage

separate magnifications, easily selected by a switch.

The gages operate at 5000 cps and measure optionally in thousandths, ten-thousandths or in millions.

The line consists of a cabinet containing power unit and indicating meter, which can be used with the height gage (shown), external comparators, snap gages or cartridge units.

Circle 308 on postcard for more data

BROWN & SHARPE MFG. CO.

HEIGHT INDICATOR—Pictured is the Hite-Icator. This device features a sensitive dial indicator which is actuated by the gage-block column it-



Brown & Sharpe Hite-Icator

self, as it moves up and down over the one inch range of the micrometer head. It is therefore easy to position within a thousandth of an inch.

Circle 309 on postcard for more data

MAGNAFLUX CORP.



TESTING UNIT - The NQ-242 testing unit employs the watersuspendible magnetic particle inspection method, either visible or fluorescent. And provides a rapid means for production testing of small ferrous parts up to 24 in. long. The unit, which operates from 220/440 v. 50/60 cps, 3 phase current, has a dc magnetizing output of 1750 amp through the heads and 6000 ampere-turns through the coil.

Circle 307 on postcard for more data

PICKER X-RAY CORP.

PORTABLE X-RAY UNIT—A 50 lb industrial X-ray generator, small enough to pass through a six inch opening but powerful enough to radiograph 1¼ in. of steel in 45 seconds, has been designed.

The Andrex 140 KV X-Ray Unit, designed for inspections by one man of pressure vessels, castings, aircraft, missiles, etc., detects inner flaws in the metal.

The unit consists of two parts—the 50 lb generator and the 55 lb control. Meters and stepless controls permit constant monitoring during each exposure to prevent the necessity of retakes due to line voltage fluctuations or other variable factors. Both generator and control are sealed to permit uninterrupted use.

Circle 310 on postcard for more data

BESLY-WELLES CORP.

DEPTH-INDICATING DEVICE — This visual depth micrometer, called the Besly Readepth, can be used to check the depth of holes, slots, keyways, etc. It has a large easy-to-read dial and can readily set to changed dimensions. It is accurately reset with the masters supplied, therefore, no

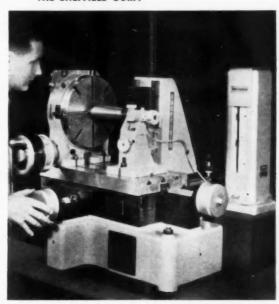


Besly Readepth for checking depths

jo-blocks or other masters are required. Constant accuracy from $0\ {\rm to}\ 3$

THE SHEFFIELD CORP.

Sheffield three dimension cam measuring machine. Micrometers used on this machine have an accuracy of plus or minus 0.000010 in. per inch.



THREE DIMENSIONAL CAM MEASURING MACHINE—This Precisionaire measuring machine is for inspecting the contour of two and three dimension cams. Three dimension cams up to three inches radius and six inches long can be inspected on the unit which uses a bench space of 32 by 26 in. Irregular shaped parts requiring precise measurement can be also inspected. The cam is located between centers of the table and tailstock. After adjustments are made with the rotary index table and axial micrometer, the fiducial

indicator stylus is brought into contact with the cam at the starting point by adjusting the front micrometer until the float in the column Precisionaire is at zero. The cam is then advanced to the next inspection point. Then, the float in the column instrument is returned to zero and the micrometer read for amount of deviation.

Radial and axial movements can be made to an accuracy of 0.00001 and angular position to within plus or minus six seconds of arc.

Circle 312 on postcard for more data

in. is assured because resetting is required only when the contact rods are changed.

Circle 311 on postcard for more data

STEWART-WARNER CORP.

PORTABLE BALANCER — This portable balancer has been designed for ease of operation. Highly sensitive, the instrument is adjustable to any job from below 10 millionths of an inch to over 1/10 to 1/8 in. amplitude of vibration. The unit is suited for eliminating vibration in grinding wheels and cutter heads for fine finishes and close tolerance work; and detects vibration caused by worn bearings, belts and misalignment.

In operation, the amplitude of vibrations of the part under test are electromagnetically converted into

electrical impulses by the vibration pick-up unit. These impulses are then amplified in the electronic unit which triggers a strobe light to "freeze" the image of the rotating part, pin-pointing the trouble source. The angle of unbalance is indicated through the stroboscope and the amount of vibration appears on an easy-to-read meter.

Circle 313 on postcard for more data



Stewart-Warner precision, portable balancer

Quality Control Equipment

VINCO CORP.

SPLINE GAGE UNIT—The Splindicator combines the function of five gages for gaging splined shafts. Replacing the Go and Not Go composite rings and master plugs for each, it answers the demand for a master ring



Vinco Splindicator spline gage unit

to check the spline gage for the internal spline.

The indicator of the gage is set by means of a master setting plug of verified tooth thickness. The gage gives an accurate check of the "effective tooth thickness," eliminates human error, shortens inspection time, detects back taper, affords unlimited gage life, and is adaptable for semi-automatic gaging.

Circle 314 on postcard for more data

TINIUS OLSEN TESTING MACHINE CO.

RUPTURE TESTING MACHINE— Uniform loads are applied and maintained indefinitely with an air operated creep-stress rupture testing machine. Variable loads to 12,000 lb are applied without shock and maintained regardless of normal fluctuations in line pressure. Load is indicated by either of two precision gages—one for the low range of 0 to 3000 lb and the other for the high range of 0 to 30,000 lb.

Specimens may be tested at any temperature from 0 to 1800 F or 2000 F, which is automatically maintained by an electrically operated furnace, which swings in or out of the testing area.

Circle 315 on postcard for more data

SIZE CONTROL CO.

INSPECTION INSTRUMENTS— The Bore-O-Scope inspection instrument is adaptable to many operations such as, inspection of missile and rocket components and normal and difficult manufacturing and maintenance operations.

The optical system it employs gives

a clear view forward, retrospectively, right angularly, and forobliquely. It is available in various diameters, lengths, and angles of vision, as well as in flexible and rigid shaft models.

The Inspect-O-Scope, another high precision inspection instrument, is particularly geared for use in inspection problems of the metal working industry, etc.

Circle 316 on postcard for more data

TESTING MACHINES, INC.

HARDNESS TESTER — Model H5 Wallace dead load micro-hardness tester for rubber, rubber-like materials, and plastics is said to eliminate the need to mold standard size test specimens and permits the hardness of small parts, sheets, and irregular shapes to be measured directly.

The depth of indentation is measured electronically. The basic machine consists of an indentor and a means of applying a minor and then a major load.

Circle 317 on postcard for more data

BAUSCH & LOMB OPTICAL CO.

BENCH COMPARATOR - A bench comparator with two major accessories, a Surface Illuminator and Protractor Ring, has been developed. The ring consists of a fixed ring assembly, graduated ring, vernier scale, and clamp arrangement. The ring in which the ground glass screen or chart is held is rotatable within the fixed ring. The illuminator consists of a 50w, 115v lamp, a fixed condensing lens system, a mirror and a focusable projection lens. The projection lens concentrates the available light on the area covered by each objective used with the Bench Comparator.

Circle 318 on postcard for more data



Bausch & Lomb Bench Comparator

PORTAGE DOUBLE QUICK, INC.

LAYOUT MACHINE—The Portage layout machine can quickly layout vertical and horizontal, inside and outside layout lines.

The machine features direct reading scales graduated in inches, separate adjustable vernier scales reading 0.010 in. for vertical and horizontal measurement, positive locks for horizontal arm and vertical column, and hand knobs for fine adjustment, among other devices.

Circle 319 on postcard for more data

GLEASON WORKS

VARIABLE SPEED TESTER—For final testing of hardened automotive spiral and hypoid gears, the variable speed No. 17A-4000 Hypoid Tester provides test results directly correlated to final performance in the completed vehicle. The variable spindle speeds of 400 to 4000 rpm offer a complete test throughout the normal range of vehicle operation—corresponding to about 10 to 100 mph.

The machine handles gears up to 18 in. in diameter. It can also handle straight and Zerol bevel gears with shafts at 90 degrees.

Circle 320 on postcard for more data

AMERICAN CHAIN & CABLE CO., INC.

HARDNESS TESTERS—Fully automatic Twin Tester units are capable of conducting up to 1000 tests per hour—testing the hardness of both ferrous and non-ferrous metals and



Wilson Twin Tester checks metal hardness

classifying the metals as too hard, too soft or correct. Manual testers average about 300 tests per hour.

Circle 321 on postcard for more data



Call Crucible for stainless of uniform excellence

The lustre of Crucible stainless is achieved through precision-rolling on modern mills. Uniform physical properties are maintained by checking each heat - while electronic measuring controls ensure accurate gauge. Such methods produce coil after coil of uniform excellence. For stainless in all gauges down to .010" and in all strip widths, call or write: Crucible Steel Company of America, The Oliver Building, Mellon Square, Pittsburgh 22, Pa.

CRUCIBLE STEEL COMPANY OF AMERICA

CANADIAN DISTRIBUTOR - RAILWAY AND POWER ENGINEERING CORP., LTD.

Amorphous phosphate (Amchem Alodine). This a protective coating for aluminum and aluminum alloys.

A REVIEW OF PHOSPHATE COATINGS Specified for the Protection of Metal Surfaces

By HUGH GEHMAN, Assistant Manager, Product Development Dept., AMCHEM PRODUCTS, INC.

Phosphate coatings are protective inorganic finishes that actually change the chemical nature of metal surfaces. The metal reacts with the applied phosphate solution to form a nonmetallic, crystalline coating which serves to:

- Improve paint adhesion
- · Provide protection against corrosion
- · Increase lubricity of friction surfaces
- · Facilitate mechanical deformation of metals
- · Decorate—in many instances

Satisfactory protection of steel, zinc and aluminum surfaces against corrosion, paint peeling and blistering,



Typical automotive spray installation.

and hard wear requires precision methods of chemical conversion coating.

Types of Conversion Coatings

There are seven classes of chemical conversion coatings commonly specified and used throughout industry today. They are as follows:

Zinc-iron phosphate (Amchem Granodine). This is the heaviest type of coating (gray in color) used for prepaint treatments on steel, iron and zinc surfaces. The process requires five or six operations: cleaning; rinsing; rust removal, if necessary; coating; rinsing; and a second rinse. Coating weight ranges from 100 to 600 mg per sq. ft.

Medium or large volume production of automobile bodies, appliances, projectiles and cabinets can be handled effectively.

The coating solution improves paint adhesion by forming a crystalline deposit over the metal surface. This deposit is rough, as revealed microscopically, and so offers an ideal gripping surface for paint particles.

Manganese-iron phosphate (Amchem Thermoil-Granodine). This is a heavy black coating used on friction surfaces to prevent galling, scoring and seizing of parts. Typical

metal parts treated are pistons, piston rings, gears, cylinder liners, camshafts, tappets and various small arms components.



Typical appliance treatment line.

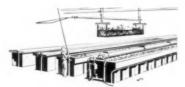
Iron phosphate (Amchem Duridine). This is a comparatively new process that places a light coating on surfaces for improved paint adhesion. Since cleaning and coating occur in the same bath, it has only three to five stages.

The iron phosphate treatment is a spray process suited for medium to large volume, large or small work. Precleaning is normally unnecessary, an economy factor in its favor.

Products protected by this process are steel or iron fabricated units, such as cabinets, washing machines and refrigerators. Weight of coating is 50 to 100 mg per sq. ft.

Zinc phosphate (Amchem Lithoform). This is a crystalline coating produced on galvanized iron and other zinc surfaces-also cadmiumfor improving paint adhesion. The purpose of the coating is to provide a paint-gripping surface and to prevent the reaction between acidic components of the paint and the zinc metal, with the formation of soaps and loss of paint adhesion.

This coating is applied in weights 75 to 500 mg per sq. ft. There are no limitations on volume or production or on size of products treated. Zinc phosphate coating is used on zinc alloy die castings, zinc or cadmium plated sheet or components, hot dip galvanized stock, and

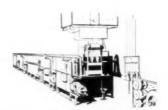


Typical aircraft dip installation

It may be used in place of anodic deposition for improved paint adhesion and corrosion resistance.

This coating is practical for production in any volume. Coating weight is 100 to 600 mg per sq. ft. Products treated include aluminum awnings, doors and windows, aircraft and aircraft parts, missile parts, roofing and siding. Particularly good when al uninum is painted prior to forming.

Zinc-iron phosphate for oil absorption (Amchem Permadine). This is a relatively heavy coating adapted to the retention of rust-inhibiting drying or nondrying oils and waxes on ferrous metal surfaces. The coating is applied to a weight of 1000 to 4000 mg per sq. ft.



Typical continuous strip line installation.

The process is satisfactory for large or small work in any volume-nuts, bolts, hardware, guns, tools, etc.

Zinc-iron phosphate for metal forming (Amchem Granodraw). This is a specialized coating used in conjunction with a suitable lubricant to facilitate the cold mechanical de-formation of steel. The coating acts as an anchor for the lubricant throughout drawing, extrusion, and cold forming operations.

It is a successful treatment for products such as blanks and shells for cold forming, heavy stampings, impact extruded shapes, drawn wire and tube.

For more complete information about any one or all of these chemical conversion coatings, contact an Amchem sales representative or write us at Ambler 28, Pa.



AMCHEM PRODUCTS, INC. (Formerly American Chemical Paint Co.)

AMBLER 28, PA. . Detroit, Mich., St. Joseph, Mo., Niles, Calif., Windsor, Ont.

Amchem, Granodine, Thermoil-Granodine, Duridine, Lithoform, Alodine, Permadine and Granodraw are registered trademarks of Amchem Products, Inc.

do you have
OIL SEAL TROUBLES?

SUPERFINISH can solve them!

Here's a typical case where a shaft with ground surfaces was driven at a speed of 1750 r.p.m. The oil seals created enough heat to burn the shaft and stop the motor. To make matters worse, it was found that twice the original speed was necessary. So, the oil seal surfaces were Superfinished, and the shaft operated at a speed of 3500 r.p.m. With the Superfinished surfaces, no heat was developed at this higher speed. No further trouble was encountered.

Superfinishing is a quick, simple and inexpensive process. Oil seal surfaces are but one of the many applications where it can save you money. Not only can it eliminate trouble, but, often it can help you reduce manufacturing costs. Gisholt engineers can advise you regarding its applications.

Write now for new Superfinish Catalog No. 1169-B

GISHOLL Superingues Superfinished

Superfinished

MACHINE COMPANY

GISHOLT GSHOD

Madison 10, Wisconsin

ASK YOUR GISHOLT REPRESENTATIVE ABOUT GISHOLT FACTORY-REBUILT MACHINES WITH NEW MACHINE GUARANTEF

Welding Equipment SECTION

RESISTANCE
SHIELDED ARC
SHIELDED GAS
CONTROLS
SEAM AND SPOT
WIRE AND RODS

FOR ADDITIONAL INFORMATION please use reply card at Back of Issue

HOBART BROTHERS CO.

SEMIAUTOMATIC WELDER — A portable semiautomatic welder, known as the Handomatic, has been designed for either open arc hard surfacing or submerged arc welding.

The unit features a universal semiautomatic wire feeder specifically designed for hard surfacing, build up, and mild steel welding using tubular wires or solid wires, open arc or submerged arc process.

Feed rolls, pressure rolls and current tips are available for 5/64 and 3/32 in. solid hard wire; and 3/32 and 7/64 in. tubular wire. The unit is designed for use with continuous current up to 500 amps using the flux type or open are gun. The flux hopper holds five pounds of flux.

Circle 322 on postcard for more data

FORNEY ARC WELDERS, INC.

ELECTRIC ARC WELDERS—Eight different models of electric arc welders have been designed for many applications. Including a heavy-duty 350 amp limited input industrial model, the complete line of a-c transformer arc welders and accessories fills industrial needs for general purpose welding.

Sizes range from the 5 to 80 amp F-100 welder with six heat stages to the 5 to 350 amp Model I heavy service unit with 36 heat stages. The cases are of special design and construction eliminating the undesirable effects of eddy currents. Forney welders are thoroughly waterproofed



Forney electric arc welders

and insulated for outdoor or indoor service. They accommodate rod sizes from 1/16 to ¼ in. diameter in types designed for a-c welding of cast iron, mild steel, high carbon steel, stainless alloy, aluminum, and other metals.

Circle 323 on postcard for more data

GROTNESS MACHINE WORKS

WELD ROLLER—The #2-LC weld roller is a combination dual purpose longitudinal circumferential weld roller which develops great force at the rolls (25 tons at top pressure of 1000 psi) for the smooth and fast rolling of both butt and lap seams. The machine is hydraulically operated. Rolled welds are flattened to the thickness of the parent metal and the parts can be processed without any further work on the welds.

The longitudinal end of the machine rolls welds on parts with diameters ranging from 5½ in. minimum to 36 in. maximum, with one pass rolling on work up to 14½ in. long with a minimum diameter of 5½, and up to 18½ in. long on pieces with diameters greater than 8 in. OD.

Circle 324 on postcard for more data

WESTINGHOUSE ELECTRIC CORP.

ULTRASONIC SEAM WELDER -This ultrasonic seam welder can weld sheets of dissimilar metal continuously. Sheets of metal to be welded are passed through two wheels vibrating at 20 kilocycles per second. The periphery of the wheels press against the metals on opposite sides of the sheets. At the point of contact, the wheels break up the oxide coating on the metal surfaces and by a kneading action weld the metal lattices on the surfaces of the metals themselves. No electric current is passed through the spot being welded although in appearance the ultrasonic seam weld is similar to that of an electric weld. A variable speed drive moves the metals through the unit as the weld is completed by means of vibrating wheels.

Circle 325 on postcard for more data



Westinghouse seam welder

CLARK EQUIPMENT CO.



DC ARC WELDING UNIT—Shown is the Aircomotic Fillererc Welder designed for consumable-electrode, gas-shielded welding processes where equal burn-off rate and wire-feed must be maintained. Current rating is 450 amp continuous. Circle 326 on postcard for more data

THE FEDERAL MACHINE & WELDER

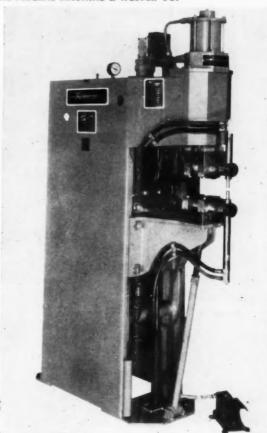
WELDING FIXTURE — A line of welding fixtures, or bucks, for use in portable gun welding of parts, features light weight rigid construction, and the frame is of fabricated square steel tubing design.

The contour form locators are built up of plastics and consist of a number of pads around the outside edges of the assembly and along the welding seam and wherever the necessary intermediate spots are required.

Circle 327 on postcard for more data

THE FEDERAL MACHINE & WELDER CO.

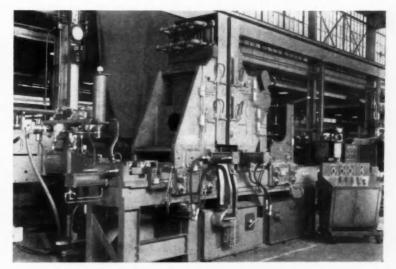
PRESS TYPE RESIS-TANCE WELDERS-A line of press type resistance welders is available in four sizes ranging from 30 to 500 inclusive. Each size is available as a spot welder, a projection welder, or a combination spot and projection welder in of standard depth, elecrange throat trode forces and transformer sizes. Some of the design features are: one-piece slim line frame, easily adjusted for wear or take up, no covers to be removed. The integral transformer and lower arm gives high performance and maximum power efficiency. These welders are styled and constructed to deliver high production runs at low costs; they conform modern production line requirements, neat, clean and compact. Circle 328 on postcard for more date



SCIAKY BROS., INC.

FLASH-BUTT WELDER—Designed for the continuous end-to-end fastening of flat wide strip stock, this 400H flash-butt type welder is used in various mill and process operations.

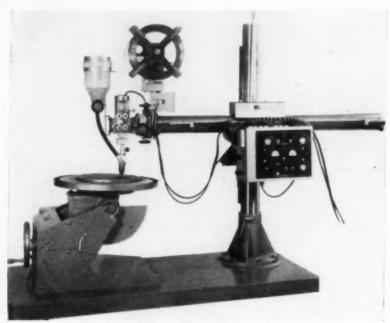
The machine shears off flash particles so that a continuous flush surface is maintained. Named the Sciaky BP.3-400H machine, it is designed for flash-butt welding hot rolled, low carbon steel ranging from 0.060 to 0.200 in, in thickness and from 12 to 22 in. in width. Or, a maximum capacity of 4.5 sq-in. cross sectional area of mild steel, and 2.6 sq-in. cross sectional area of stainless steel. The upset force is adjusted to a maximum of 90,000 lb, while clamping force is adjustable to a maximum of 135,000 lb. Maximum platen opening is eight inches, and flashing action is accomplished by means of the right hand platen. Pressure lubrication can be provided. The secondary or welding



Sciaky Bros. flash-butt welder for use in various mill and process operations

current is obtained from air cooled welding transformers rated at 400 kva at 50 per cent duty cycle. Circle 329 on postcard for more data

Welding Equipment



Miami flexible manipulator for automatic welding has infinite travel speeds

MIAMI SPECIALTIES CO.

AUTOMATIC WELDING FIXTURE

—A flexible manipulator for automatic welding, consisting of a vertical mast and a horizontal boom mounted on a pedestal or cylindrical

type, has been designed. The boom is made of tubular steel with machined, steel guideways and rack gear. It has infinite travel speeds from 10 to 150 ipm and is powered from power and gas supplies. Designed for welding jobs where portability of equipment is required, the torch weighs three pounds, the control box less than 20. The torch is rated at 300 amps.

Torches are available for the full welding range with either 0.030 or 1/16 in. aluminum wire.

Circle 331 on postcard for more data

LINDE CO., DIV. OF UNION CARBIDE

WELDING PROCESS—A new welding process, called "Short-Arc," has been developed. It permits manual and mechanized welding of thin material with excellent control of the weld puddle. The outstanding feature of this inert-gas consumable-electrode process is the ability to make manual fusion welds in the range of thickness of 0.030 to 0.100 in. of all common metals, such as carbon steel, stainless steel, aluminum, copper, etc., in all positions and types of joints.

Circle 332 on postcard for more data

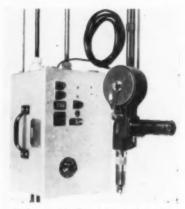
by a ¼ hp, 110 v dc motor. Maximum clearance of the boom is 42 in. and the effective weld length is 42 in. Limit switches stop overtravel.

Circle 330 on postcard for more data

LINDE CO., DIV. OF UNION CARBIDE CORP.

WELDING TORCH — For consumable-electrode inert-gas metal-arc welding, this Sigmette torch combines portability and easy maintenance.

The wire spool mounted right on the torch lets the operator get at jobs in confined spaces and areas remote



Linde portable Sigmette welding torch

THE FEDERAL MACHINE & WELDER CO.

MOBILE GUN UNIT-This mobile gun unit developed for general purpose portable spot welding of parts. It features a light weight welded steel cart for ease in moving the unit from one weld position to another. The welding transformer, heat regulator, electronic controls, air controls, air valve and flexible cables with air operated gun, are all mounted on the cart. Circle 333 on peatcard for more data



ZEPHYR MFG. CO., INC.

PORTABLE WELD SHAVER—Removal and finishing of weld beads by multiple grinding and sanding operations may be performed in one operation with the Weld Shaver. De-



Zephyr Model ZT508 weld shaver.

signed primarily to meet the needs of the aircraft and missile manufacturing industry, the device uses a rotary cutter to remove excess filler and shave weld beads to surface plane. The cutter is mounted between adjustable rollers which straddle, and follow, the weld bead on flat, convex or concave surfaces.

Named the Model ZT508, the shaver is for use on stainless steel, steel and titanium welds and is geared to operate at 3000 rpm. It is 11¼ in. long and weighs 9½ lb.

Circle 334 on postcard for more data

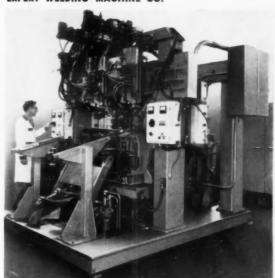
THE FEDERAL MACHINE & WELDER

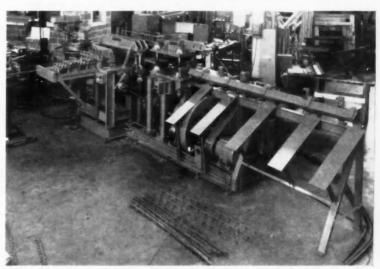
SEAM WELDER—A machine has been designed to seam weld overlap flanges in panel vent outlet ducts. The weld is about $2\frac{1}{2}$ in. long on the right hand duct and about 2 in. long on the left hand duct. The machine has a fabricated steel frame which supports the welding head, a fixed mandrel, and forming clamps. It also has a transfer cylinder to move the part from the load station into the work stations and to eject it. Welding pressure comes from a five inch diameter cylinder giving a pressure of about 1200 lb.

Circle 335 on postcard for more data

EXPERT WELDING MACHINE CO.

MAGNETIC TAPE TRACER WELDING SYSTEM-A magnetic tape tracer welding system that permits the joining of metal parts having untrimmed, outof-tolerance, struight line or contour weld line edges in a continuous automated welding operation has been designed. The system controls self powered welding heads which automatically follow any type welding contour with a high degree of accuracy. Circle 326 on postcard for more data





Precision Welder automatic welding and forming machine produces wire bolsters

PRECISION WELDER & FLEXOPRESS CORP.

AUTOMATIC WELDING AND FORMING MACHINE — Wire bolsters are produced automatically at the rate of 5000 feet per hour on this automatic welding and forming

machine. All elements of the machine are driven and timed from a crank-shaft coupled to a 5 hp motor and flywheel by an air clutch and brake.

Circle 337 on postcard for more data

PANDJIRIS WELDMENT CO.

DOUBLE MANDRELED SEAMER—Twin mandrel weld seaming fixture to achieve continuous arc time, maximum production; and operational utility of one automatic welding head and power source is available through

a line of opposed double mandreled seamers with both holding and clamping mandrels utilizing the same welding head.

While the welding cycle is taking place on one side of the fixture, the next piece to be welded is being loaded in the opposite side, thereby eliminating production loss due to normal down time for loading and unloading. And by continuing the weld to the next piece to be welded, with loading and unloading taking place.

Circle 338 on postcard for more data



FOR ADDITIONAL INFORMATION please use reply card at Back of Issue

THE S-P MFG. CO.

TRUNNION MOUNTED UNITS—A line of adjustable trunnion mounted heavy-duty air and hydraulic cylinders, featuring positive adjustment and a one-piece trunnion, is built to major automotive manufacturer's and JIC standards, with pressure ratings of 200 psi(air) and 1000 psi(hydraulic).

Nine bore sizes are available. All models are offered non - cushioned, cushioned blind end, cushioned rod end or cushioned both ends; in five styles. Cushion check and adjustment are interchangeable. Mounting dimensions of cushioned and noncushioned cylinders are identical.

Piston and cartridge-retained rod seals are designed for operation at temperatures ranging from -20 to 150 F. Special seals for higher or lower temperatures and piston ring construction, for hydraulic cylinders only, are optional.

Circle 339 on postcard for more data

RAYBESTOS-MANHATTAN, INC.

BONDING ADHESIVES—Two adhesives for cementing bondable Teflon to itself or to other materials have been developed.

The first, Ray-Bond R-86009, is for applications where some flexibility in

the bond is required. It has good resistance to water and most chemicals. The other, Ray-Bond R-86044, features resistance to acids (except acetic) and various other chemicals, as well as water.

Circle 340 on postcard for more data

ROCKWELL-STANDARD CORP.

DRIVE LINE COMPONENTS—Hydra-drive torque converters were developed to meet special needs in earth moving, construction and materials handling equipment. The unit provides the equivalent of a gear transmission with many ratios which automatically selects the right ratio to utilize the maximum power efficiency.

The transmissions are designed for use in heavy-duty equipment used in off-the-highway work where multispeed operation is required such as road graders, front end loaders, and military vehicles.

Unit consists of a torque converter and a power shift transmission in one integral housing. With four speeds forward and reverse, the unit is suited for vehicles that must travel in different directions during a normal work cycle.

Circle 341 on postcard for more data

E. W. BLISS CO.

TWO-SPEED CLUTCH—A two-speed clutch, split into two separate clutches mounted on opposing sides of a press, has been designed and installed on a standard two-point 600-ton eccentric draw press. The press is used to form automobile rear suspension brackets at the rate of 448 double pieces per hour.

The clutch permits three operational speeds and takes advantage of maximum approach and return speeds, while permitting slow speeds for drawing operations. Speeds of 10,-16, and 20 spm are possible by using the clutch units separately or in combination. With the fast clutch alone the press operates at 20 spm; with the slow clutch alone, at 10 spm.

Circle 342 on postcard for more data

ALAN WOOD STEEL CO.

STEEL LOCKERS—A line of 2-person steel lockers for use in industrial plants save space by providing full-height compartments for two persons in the same area required for one large individual locker.

Standard equipment includes: coat hooks, coat hanger rods on lockers 18 in. or more in depth, number plate for each door, six ventilating louvers on top and bottom of coat compartment doors and three louvers in each hat compartment door.

Coat compartment doors engage the frame at three points and are equipped with an automatic prelocking device that permits the door to be locked while open, then closed without unlocking. Each lower door controls one hat compartment door by an interlocking device, eliminating the need for additional locks.

Circle 343 on postcard for more data



Penco 2-person steel locker

NATIONAL BROACH & MACHINE CO.

BROACHING PROCESS — A broach design that is said to cut the cost of producing precision internal spur and helical gears and splines has been introduced.

Called Full-Form Finish broaching, the process makes use of a combination roughing broach and removable shell-type finishing section that enables gears or splines to be produced in a blank in a single broaching operation.

A Red Ring full-form finishing broach has a long roughing section of conventional design that produces the internal spline or gear teeth to rough



Red Ring Full-Form Finishing broach shell shown with a variety of internal spur and helical running gears that have been produced by the new process.

size. Mounted on a pilot on the end of the broach is a short shell broach that performs the tooth finishing operation.

Circle 344 on postcard for more data

ALLIS-CHALMERS MFG. CO.

ADJUSTABLE SPEED DRIVE—Adjustex sheaves—simplified, stationary adjustable speed sheaves, are available from Allis-Chalmers. The sheaves are available for A, B and C section belts in two, three and four-groove construction.

Pitch diameter adjustment is made through a single adjusting screw and a hollow lock screw. Relative position between stationary and movable disks is positively maintained at all pitch diameters without disk to maintain sleeve set screws.

Circle 345 on postcard for more data

MINNEAPOLIS-HONEYWELL REGULATOR CO.

DIRECT CURRENT AMPLIFIERS

—Two direct current amplifiers, the
AccuData 1 and 11, were designed
for use in data-acquisition systems
and feature isolated differential input
which completely eliminates ground
loop problems and increases resistance to unwanted voltages which

PUNCH PRODUCTS CORP.

HOLE PUNCHING MACHINE - The Unipunch Model 1012, equipped with precision Unipunch gaging and tooling is for hole punching in angles, channels, extrusions and sheets plus notching operations. press is available with 37 round punches and 74 dies with 4 Unipunch hole punching units and one Unipunch notching unit. In addition to punching round and shaped holes and notching corners and edges, this press may be used for punching extruded and countersunk holes, small louvers, and lanced holes. Small die sets may be installed for stampings. With a template, several units may be set up for making a cluster hole pattern in place of custom punches and dies.

Circle 346 on postcard for more data



could occur between input leads and ground.

The AccuData 1 combines two Honeywell second harmonic magnetic converters to provide ideal d-c transducer preamplifier characteristics and incorporates isolated differential input for strain gage, thermocouple and resistance bridge measurements. Its output is single-ended.

AccuData 11 embodies the added feature of being completely transistorized and designed for wide-band differential amplification, high frequency oscillograph and tape recorder applications.

Circle 347 on postcard for more data

THE CINCINNATI MILLING MACHINE CO.

CORRECTING ATTACHMENT — A taper correcting attachment applicable to Cincinnati Filmatic Centertype Grinders up to 48 in. length can be applied to the company's 4 to 14 in. plain grinders and on all sizes of their universal grinders. It is employed primarily to obtain exact alignment of the swivel table, thereby eliminating uncertain "cut and dry" methods when grinding the work to precise accuracy of straightness.

Circle 348 on postcard for more data

HANNIFIN CO.

AIR POWER PACKAGE — A combination of air power cylinder and electrically actuated control valve with built-in speed controls has been announced.

Named the Hannifin Air Motor, the unit combines all three basic components in a single air power package. Installation requires only one air line connection and simplified wiring to



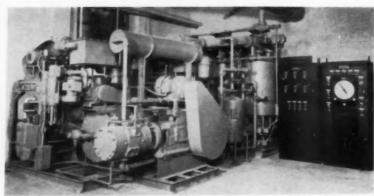
Hannifin air power package

the solenoid-actuated, pilot-operated valve.

The square-head cylinder has a rust-proof body, and an induction case hardened piston rod with hard chromium plated finish. The control valve is of a reciprocating disk design that will operate even when the valve is blanketed by chips or grinder dust, or when splashed with coolant. Speed controls are built into the 4-way valve port plate and provide adjustment of cylinder piston speed in both directions.

Circle 349 on postcard for more data

Specialized Equipment



Lindberg nitrogen generator packaged unit completely piped and wired

LINDBERG ENGINEERING CO.

PACKAGED GENERATOR UNIT— This nitrogen generator packaged unit completely piped and wired for the production of nitrogen atmospheres by combusting a mixture of air and natural gas is automatic, once started.

The atmosphere produced is CO₂free, dry combusted gas which may be varied from rich to lean ratios of the air-gas mixture of the exothermic generator. The generator can also be operated on the oxidizing side to eliminate all combustibles, if desired.

The atmosphere produced can be used for any application where a high nitrogen, CO₂-free, dry atmosphere is required, such as heat treating and melting fields of the metals industry.

Circle 350 on postcard for more data

hydraulic gear pump which has pressure-loaded bearings for long-life operation. Fluid pressure is maintained by an accumulator, allowing from two to three lifts between each motor

running cycle.

Circle 351 on postcard for more data

PESCO PRODUCTS DIV., BORG-WARNER CORP.

ELECTRO-HYDRAULIC HOIST— A line of electro-hydraulic servohoists designated AWB is available in four sizes having nominal capaci-



Pesco Model AWB servo-hoist

ties of $\frac{1}{4}$, $\frac{1}{2}$, 1 and 2 tons. Material can be raised up to 10 ft with any of the four models.

The entire powering mechanism is contained in the overhead trolley assembly. An electric motor drives a

F. J. LITTEL MACHINE CO

CENTERING REEL—A line of automatic centering 3-arm reels for heavy coils of copper, bronze, brass and tin plate stock is especially designed for controlled uncoiling action.

They will accommodate coils up to 4000 lb, of 45-in. maximum OD and 18 in. maximum width. The minimum ID, 8½ in. to 10½ in., is especially adapted to the normally smaller inside diameters of copper, bronze, brass and tin plate stock.

Circle 352 on postcard for more data

SUNDSTRAND MACHINE CO.

PACKAGING MACHINE—A machine for packaging long, irregular objects in a wide variety of shapes has been announced by Sundstrand Machine Tool Co.

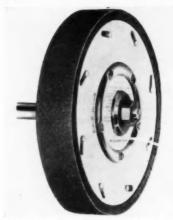
Named the Packmaster Model 56, the machine handles objects from ¼ to 2 in. thick, and packages them in cohesive paper up to 12 in. wide.

Parts are placed between sponge rubber rollers and fed automatically through the wrapping, cut-off and marking stations and the finished wrapped part is then ejected into a shipping container or onto an exit belt. Machine speed is adjustable from 0 to 120 fpm by means of a variable speed drive.

Circle 353 on postcard for more data

OHIO RUBBER CO.

EXPANDING WHEEL—This expanding wheel for circular abrasive belts is self-balancing and maintains a flat edge, so that it can be used for such work as polishing, tool grinding and rough deburring. The wheel has a floating action which frees it from



Ohio expanding wheel for circular abrasive belts is self-balancing.

edge distortion due to centrifugal force, and allows it to achieve dynamic balance in operation.

Circle 354 on postcard for more data

REPUBLIC STEEL CORP.

LOW ALLOY IRON POWDER—A high strength, low alloy iron powder, designated Type 6460, incorporates small quantities of nickel and molybdenum as alloys. Type 6460 may be fabricated to develop minimum tensile strengths of 60,000 psi as sintered and 100,000 psi when heat treated.

Fabrication of parts from Type 6460 permits normal briquetting pressures, normal sintering cycles and normal heat treating procedures. The dimensional characteristics after sintering fall within the commonly accepted tolerances of the powdered metal industry.

Circle 355 on postcard for more data

THE TORRINGTON MFG. CO.

COOLING BLOWER—High efficiency, low pressure centrifugal blowers in a complete series from 2 to 9 in diameters have been designed for cooling electronic equipment. The range of air delivery is from 20 to 2000 cfm, depending upon the impeller size and motor speed. Input



Torrington centrifugal blower

power is provided by either ac, dc or 400 cycle aircraft motors. Total weight of the unit is less than two pounds.

Circle 356 on postcard for more data

THE CROSS CO.

TOOL DETECTOR—A tool detector has been developed to eliminate separate probe and inspection heads and stations. It prevents processing of "scrap parts" and, by signaling the control panel and shutting down the machine when one tool breaks, prevents additional tool damage.

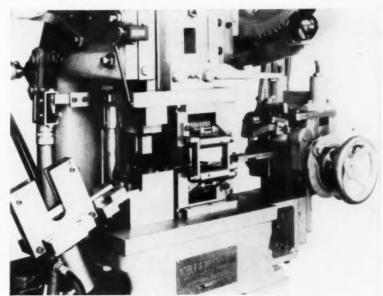
Designated the Protect-O-Tool, this device is an electronic mechanism that senses the presence or absence of a tool or even a part of a tool in cases where a small piece of a drill or tap breaks off and remains in the work piece. The device is mounted on bushing plates behind the regular drill bushing hole. Tool detection occurs as the drill or tap passes through the detector before and after machining.

Circle 357 on postcard for more data

AIR REDUCTION CO., INC.

HAND CUTTING TORCHES— Known as the Airco 2000 Series, a line of injection-type hand cutting torches designed for use with propane and natural gas, features an "ease-on" oxygen valve which allows smooth and gradual oxygen flow.

The torch head is a machined silicon bronze forging and for rigidity



Noble & Westbrook Model 507 makes embossed identification tags automatically

NOBLE & WESTBROOK MFG. CO.

MARKING PRESS—This machine makes embossed identification tags from brass wire stock in any predetermined quantities at production speeds up to 3000 per hour.

Built around a standard 10-ton back geared press with roll feed, this Model 507 has special tooling consisting of a multi-station die set including male and female embossing head which stamps a raised or formed impression in the tag. An automatic embossing head advances consecutively with each stroke of the press.

The press is furnished complete with motor drive, starter and solenoid operating valve for pneumatic stacker; combination air control unit consisting of filter, regulator, lubricator; a predetermining counter and special control circuit, making it possible to run off a given amount of tags.

Circle 358 on postcard for more data

and strength the brass gas tubes are in a triangular arrangement.

Mixer housing is a machined brass forging which is fed by two short tubes, one for fuel and one for preheat oxygen. The rear of the forging and the inlet connections will accommodate $\frac{1}{4}$, $\frac{5}{16}$ or $\frac{3}{8}$ in. hose.

Circle 359 on postcard for more data

TUBULAR RIVET & STUD CO.

RIVETING MACHINE — The Model 110A riveting machine automatically feeds and sets semitubular rivets up to 5/16 in. diameter and 18/16 in. long. It has a standard throat depth of 10 in. A feature of the unit is an eccentric actuated toggle linkage attached directly to the spindle. This mechanism enables the machine to develop a maximum force through the rivet setting range, and eliminates most of the vibration and jar.

Circle 360 on postcard for more data



Tubular Model 110A riveting machine

Specialized Equipment

LORD MFG. CO.

BONDED MOUNTING — Double extension center bonded mountings for isolation of severe vibratory, shock and related disturbances have been developed for use in flexible suspensions for all types of mobile, transportmounted and portable equipment. The



Lord elastomeric mounting has three compression sections

mounting is of one-piece construction with the elastomeric flexing element permanently bonded to the steel inner member. Elastomeric end extensions are precompressed at installation to form two rebound shoulders for reverse loads. No lubrication or maintenance is required.

Circle 361 on postcard for more data

THE NEW BRITAIN MACHINE CO.

RATCHET WRENCH—Wedge action of a 12-tooth pawl engaging a 60-tooth gear is the principle of a New Britain ratchet design. Important features are light weight, small head, and short swing that speeds up work in close areas. The assembly has a friction-free seal to keep dirt out and lubricant in. All popular drives are available.

Circle 362 on postcard for more data

AMERICAN SEALANTS CO.

LIQUID LOCK—Loctite sealant is a thin liquid plastic that hardens without shrinkage when confined between closely fitting metal parts. It is easy to apply, and requires no heat or mixing. It eliminates the need for interference fits on bearings, sleeves, shafts and studs and locks nuts to bolts. It also seals piping and tubing joints.

Circle 363 on postcard for more data

mechanical control timer is designed to control individual spray guns so that the spray pattern follows the outline of the product and actuates the guns only when there is a surface to be sprayed. The control can be adapted to existing reciprocating or rotary spray machines.

Circle 364 on postcard for more data

STOW MFG. CO.

DRIVE SHAFT — A high speed power drive flexible shaft has been designed. Rubber covered, the shaft is for use in transmitting power at speeds of two or three times the maximum speed for the standard ball bearing flexible shaft.

It has a tight wound precision made flexible shaft core and high quality ball bearings at each end. The couplings on each end are bored to fit the particular application.

Circle 365 on postcard for more data

MICHIGAN TOOL CO.

GEAR-ROLLING FIXTURE—A low cost bench type gear-rolling fixture for accurately checking external spur and helical gears provides checking equipment covering the most-used range of gear sizes. Named Model 607, the unit will check size, eccentricity and meshing smoothness of external spur and helical gears up to 10 in. in diameter.

All deflections are shown on an integrated dial indicator in increments of 0.0005 in. The master gear assembly is spring-loaded, and rides on hardened and ground ball bearing ways. A hand-actuated cam disengages the meshing action and permits easy removal of the gear from the fixture.

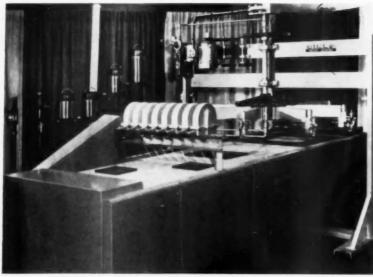
Circle 366 on postcard for more data

UNITED SHOE MACHINERY CORP.

PORTABLE RIVET TOOLS—Two lightweight riveting tools have been designed for setting small rivets up to 3/16 in. diameter in standard, overhead or blind applications. The hand tool is just slightly larger than household pliers and will set aluminum rivets of 3/32, 1/4 or 5/32 in. in diameter. The other, an air-hydraulic gun that weighs approximately 2 lb, will pull monel rivets up to 3/16 in. in size.

Both the powered and the hand tools can be used on break-stem or break-head "pop" rivets.

Circle 367 on postcard for more data



Binks mechanical timer for use with automatic spraying machines

BINKS MFG CO

MECHANICAL TIMER—Development of a control mechanism for use on either rotary or vertical and horizontal automatic spraying machines to reduce overspray and material loss has been announced. The electro-

WOOSTER DIV., BORG-WARNER CORP.

POWER PACKAGES—A line of self-contained power packages has been developed to produce hydraulic power from an electric source. The package incorporates an electric motor, hydraulic gear pump with integral relief valve, check valve and reservoir in one assembly.

Pressure loaded bearings automatically compensate for wear to assure high volumetric efficiency and longer life.

Circle 368 on postcard for more data

THE MILFORD RIVET & MACHINE CO.

PNEUMATIC RIVETER—Model 56-BH pneumatic riveter embodies a narrow cross-sectional area of machine front, allowing for single or multispindle arrangement. Attachment of



Milford pneumatic riveter with blade hopper attachment

blade hopper permits straight in-line feed of difficult to feed parts such as long tubular rivets, collar studs, and threaded or knurled parts.

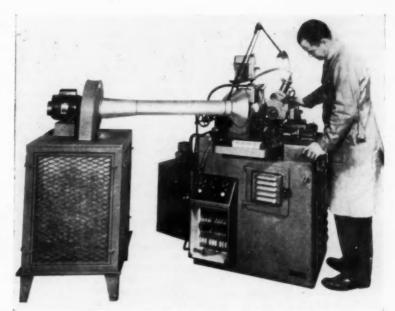
The setting machine portion is actuated by a pneumatic cylinder that drives the setting tool through toggle linkage. The blade hopper is independently driven through a separate air cylinder. The hopper system may be continuously cycled or operated intermittently. Both drives operate from a single air and lubricating control off shop air from 60 to 150 psi.

Circle 369 on postcard for more data

ANCHOR STEEL & CONVEYOR CO.

PICK-UP TROLLEY—A trolley type high-current pick-up device with capacity for handling up to 1200 amperes is now available.

Designated the Anchor Model A Hi-Amp Pick-Up, the trolley travels



Torit mist collector for use with all wet machining operations

TORIT CO.

MIST COLLECTORS—Three specific models of mist and fog collectors have been designed for use in wet machining operations of automatic screw machines, tool grinders, surface grinders, centerless grinders, and other mist producing operations. Condensed mist is collected in the bottom of the unit and can be

drained for future use, and the collector can be connected directly into the machine coolant system for continuous flow.

The units are designed to stand on the floor and, where preferred, can be mounted on walls or suspended from ceilings or overhead beams.

Circle 371 on postcard for more data

on a bus bar (rail) and transmits high-current electrical power while in motion or at rest.

Basically designed for welding and plating systems, the device is also suitable for any high current application. It is guided in all positions by nylon rollers, which require no lubrication. The roller mounting permits it to be applied to curved as well as straight bus bar sections. It can be used with either vertical or horizontal bus bars.

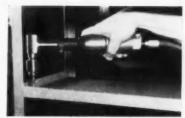
Circle 370 on postcard for more data



Anchor Model A Hi-Amp Pick-Up unit

AIRETOOL MFG. CO.

ANGLE HEAD DRILLS—Two angle head pneumatic drills have been designed for speeding up production



Airetool Model 400-RA angle drill

drilling in corners, crevices and other hard-to-reach locations. These special tools have application in aircraft, missile, automotive and industrial fields. Both are lightweight and have a powerful pneumatic motor.

They are equipped with a lever or lock button throttle control and a 3-jawed chuck and are furnished in 600, 1100, 2200, 3000 and 5000 rpm models.

Circle 372 on postcard for more data

Specialized Equipment

BENDIX AVIATION CORP.

FEED RATE OVERRIDE—Manual feed rate override that permits the operator of numerically controlled machine tools to vary cutter feed rate from that programmed on the control tape is available as a standard feature of the Bendix numerical control systems.

This feature eliminates the necessity of remaking machine control tapes to provide reduced tool loading in critical areas where variables such as cutter quality, material hardness, vibration from fixture or tool or incorrect feed rate programming cannot be taken into account. Feed rate override may be used at any time during the machining cycle without affecting the accuracy of the finished part.

Circle 373 on postcard for more data

AMERICAN CHAIN & CABLE CO., INC.

PRESSURE GAGE—Designated as the Safe-T-Case, a newly designed pressure gage with a solid and integrally cast metal from plate, has been developed. Its gasketed and deformable back plate covers the entire rear of the unit and can be forced open by a minimum pressure of 3 psi. For added safety, in the event of a sudden high pressure surge, this back plate will not detach itself from the gage. The tube will take 50 per cent overpressure up to 10,000 psi and is suitable for oils, coke gas, kerosene, inert gases, dry chlorine, high pressure steam or any liquid or gas that will not corrode steel.

Circle 374 on postcard for more data

THOMAS C. WILSON CO., INC.

PNEUMATIC GRINDERS—The 902 series of portable pneumatic grinders consist of 4 in. heavy duty horizontal grinders, wire brushing machines, and horizontal buffers.

Grinders and wire brushing machines in the series offer a choice of three speeds, 12,000, 9000, or 7200 rpm. Straight, lever, or grip-type handles may be specified.

The horizontal buffers are available in two speeds, 12,000 or 9000 rpm and offer a choice of straight, lever, or grip-type handles.

Circle 375 on postcard for more data

type instrument for static and dynamic testing of hydraulic missile components. The automatically regulated high-pressure oil system delivers up to 20 gpm at 3000 psi or 9.7 gpm at 5000 psi. A manually-operated high-pressure source produces 20,000 psi for static testing.

Circle 376 on postcard for more data

WALES STRIPPIT, INC.

PIERCE NUT UNITS—Pictured is the Strippit Pierce Nut Unit which is used for staking Fabristeel Multipierce nuts into sheet metal.

The units are independent and salf-contained with both piercing assembly and staking-die button assembly precision built into a holder so that these two functional parts are always in alignment.

Shut height is approxmate and will



Wales Strippit Pierce nut unit

vary slightly due to material variation and tolerance built-up from 5.364 with 18 gage to 5.436 with 11 gage material.

Circle 377 on postcard for more data

MOORE SPECIAL TOOL CO.

ROTARY TABLE—An 11-in. rotary table, which reads to 1 second and has an overall performance accuracy of \pm 2 seconds throughout the entire 360 degrees, has been introduced.

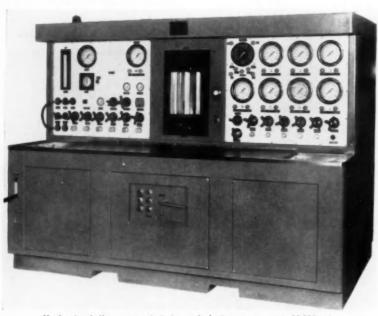
The table, named the Model No. 2 Moore Ultra-Precise rotary table, was developed to meet the demand for more precise angular spacing. This is achieved through the use of a non-disengageable, thread-ground worm in combination with the accurately spaced teeth of its mating gear.

Circle 378 on postcard for more data

AMCHEM PRODUCTS, INC.

CHEMICAL PROCESS—Serseal No. 32 Process is for use with the Granodraw Process that produces oxalate coatings on stainless steel to facilitate drawing. Serseal No. 32 produces a di-phase bath, reduces normal loss of unstable chemicals usually found in this type of process while reducing normal heat requirements for the operation.

Circle 379 on postcard for more data



Nankervis missile components test console features pressures to 20,000 psi

GEORGE L. NANKERVIS CO.

TEST CONSOLE—Model 9500 hydraulic components test console is designed for testing and analyzing hydraulic missile components under simulated operating conditions.

It is a self-contained laboratory

HUCK MFG. CO.

FASTENER INSTALLATION TOOL—A fastener installation tool of pneumatic-hydraulic design is available. Designated the Huck Model 200 Pneu-Hydra tool, the pull-action unit features a long work stroke for quick fastener installation.

The tool operates on compressed air which is converted to hydraulic power by an integral power intensifier. When operating at 90 psi air pressure it is capable of installing all blind rivets and Huckbolt fasteners requiring up to 3000 lb installation force.

Circle 380 on postcard for more data

WALDES KOHINOOR, INC.

RETAINING RINGS—A highstrength, precipitation hardening stainless steel alloy which provides corrosion resistance at temperatures up to 1000 F is being offered as an additional metal specification for the complete line of Truarc retaining rings.

The alloy—Armco Type PH 15-7, will have application in missile parts, nuclear reactor components and other areas where retaining rings are subjected to strongly corrosive conditions.

Circle 381 on postcard for more data

CONTINENTAL-DIAMOND FIBRE CORP.

LAMINATED PLASTIC—An ZZZP grade of laminated plastic for electrical applications where humid conditions are encountered is available in both plain sheets, designated as Dilecto XXXP-31EFR, and copper-clad sheets, named Di-Clad 31EFR.

Made from cellulose paper impregnated with epoxy resin, Dilecto XXXP-31EFR is used as insulation for computers and equipment requiring permanent flame-retardant properties. Di-Clad 31EFR metal-clad material is the same basic material with one or two ounce copper foil on one or both sides. It is used for printed circuit boards in the same equipment as the non-clad material.

Circle 382 on postcard for more data

SANBORN CO.

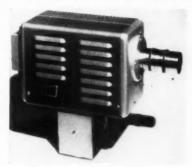
RECORDING SYSTEMS—Six or eight interchangeable pre-amplifiers mounted in a single module in seven inches of panel space and a recorderpower amplifier-power supply package permit compactness in the Sanborn 850 series direct writing oscillographic recording systems. The 850's are suitable in applications of "medium sized" dc signals such as telemetry, analog computer readout, etc. A complete 850 system is housed in a single cabinet 60 in. high.

Circle 383 on postcard for more data

DAGE TELEVISION DIV., THOMPSON PRODUCTS, INC.

AUTOMATIC TV CAMERA—Model 63A is a completely self-contained automatic television camera for industrial applications. It accommodates a light range of 120 to 1, with 50 per cent change in video output level. This is equivalent to automatic adjustment of lens stops from f/1.5 to f/16.

In addition, it automatically self-



Dage self-contained television camera

adjusts beam, target and electrical focus circuits to optimum values. The unit weighs 10 lb and measures 6% in. high by 5% in. wide by 11 3/16 in. long.

Circle 384 on postcard for more data

STANDARD PRESSED STEEL CORP.

WORK CENTER—An all-steel, L-shaped unit with a total of over 27 sq-ft of surface divided between desk and board provides separate, easily accessible work areas in a minimum of space.

The drawing board drops to a completely horizontal position and the full 27½ sq-ft of work surface area is available as a table top for conference use.

Circle 385 on postcard for more data

UNITED STATES STEEL CO.

STEEL STRAPPING MACHINE— The Model 13 lightweight power operated portable round steel strapping machine tensions, ties and cuts round steel strapping in one operation.

Weighing 20 lb, and measuring 11

by 7 by 61/4 in., the air powered machine can be held by the operator or suspended from a simple counter balancing mechanism. It can be pow-



U.S. Steel Model 13 steel strapping unit

ered by 65 lb of air pressure from the regular shop compressed air supply. Uniform tension is applied automatically regardless of the size package or number of straps used. However, tension can be changed by a simple adjustment on the machine.

Circle 386 on postcard for more data

ALLEGHENY LUDLUM STEEL CO.

INDEXABLE INSERTS — Carmet indexable inserts are cemented carbide blanks designed to be mechanically held in special holders for the turning of steel and other materials.

The inserts feature a mirror finish which reduces chip friction and cratering, thereby increasing tool performance and tool life. The finish is made by lapping the inserts with a superfine grit wheel and the cut metal slides more quickly away from the cutting edge.

Circle 387 on postcard for more data

WESTINGHOUSE ELECTRIC CORP.



PROXIMITY LIMIT SWITCH—Using a 1/2 and 2 in. maximum sensing head, this proximity limit switch is designed for applications where limit switches must be placed on the movement of a machine or a machine part.

Circle 388 on postcard for more data

(Turn to page 156, please)

By William F. Boericke

It now appears that a steel emergency is at least a month away. Consumers had protected themselves to a considerably greater extent than originally believed by pre-strike buying. In addition to generally adequate inventories there has been a substantial flow of foreign steel to help relieve any shortages. By mid-August only a comparatively small number of construction jobs along with interruption of output by an important manufacturer of line pipe had been affected by steel shortage. But in major lines-automobiles, tin cans, and appliances-there has been little complaint of lack of steel and hence little pressure from industry for the Government to intervene.

It is now quite evident that the extraordinary heavy buying in the second quarter was inspired in considerable part by the effort to build up inventories in anticipation of the best advertised strike in steel history. For confirmation, in June steel shipments soared to nearly 10 million tons and boosted inventories to an estimated 24 million tons, a gain of 11 million tons since the start of the year. Because of the work stoppage these inventories are being depleted about 200,000 tons a day. By mid-August they were estimated to total about 19 million tons.

Inventories May Become Unbalanced

However, it isn't just a case of the size of the inventories. Quite as important is the fact that as the strike continues, steel supplies become unbalanced and some shortages will develop in some sizes for which there has been a special demand. But at present the steel centers are still adequately stocked to provide consumers for nearly all products in less than carload lots.

Stainless steel production has been helped by continued operations at a few plants that were only partially struck, notably Armco and Eastern Stainless, and the same thing is true for alloy steel tubing and tool steel. Heavy plates and structurals, of which many have to be expressly designed for a particular job, are in a different position. Galvanized sheets are in shortest supply of all steel products.

Steel Imports Mount

A direct result of the strike has been the marked improvement in imports of foreign steel, although a trend in this direction was plainly visible earlier in the year. Imports in the first half of 1959 seem sure to have exceeded total imports for all of 1958 although they still total only a small fraction of U. S. domestic production. Since January imports have continued to exceed exports of steel every month. Sharply competitive have been such products as wire and pipe. Less fear has been expressed over competition from foreign cold rolled sheets and similar massproduced high volume products that are inferior to domestic products in quality.

There is considerable concern over difficulties in restoring furnaces after the end of the strike. More damage than anticipated is feared when the startup is begun. If the strike lasts eight weeks or more it may take three weeks to get the industry back to pre-strike production levels. Any hope that steel production for 1959 will come near reaching the 1956-7 record has now become extremely dubious.

No Aluminum Strike

The four largest U. S. aluminum producers and the United Steelworkers Union agreed to extend present contract terms until 30 days after a steel agreement or until Nov. 1. At this date if there has been no aluminum agreement either side may end the agreement on 10 days notice. Thus the chances of a strike are virtually eliminated. The union has been demanding 15 cents an hour more for the aluminum workers, substantially the same as for steel.

While June shipments of aluminum sheet and plate were the best for any month this year, it is likely that shipments in July when reported may show the usual seasonal drop because of the vacation period.

However, it was not known there would be no strike until late in July, hence hedge buying probably continued vigorously. But if this were the case it would be reflected in lower shipments in August and September.

Price Increase Expected

Very likely a good measure of the heavy buying has been inspired by effort to acquire metal before an expected price increase that is generally anticipated in the trade. Producers have repeatedly emphasized that the present price of 24.7 cents a pound for pig aluminum is too low and a rise to 26 cents is fully justified, which would restore the old level of April, 1958, when a 2 cent price cut was forced on the industry by heavy sales of Russian aluminum abroad. Pressure of Soviet aluminum on world markets today has largely abated and it is believed that Russian production is now largely needed for domestic use.

(Turn to page 124, please)

For Cost-Cutting Ideas,

LOOK TO THE



LINE

AUTOMATIC RE-CESSING TOOLS feature mester holder, interchangeable adapters, and two com-follower pins for accurate, dependable performance.

MAGIC CHUCKS—feature quickchange, interchangeable collets and principles of construction for accuracy, convenience, and long life.

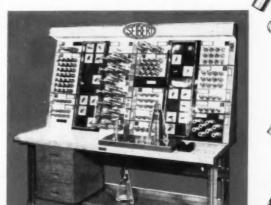
FLOATING HOLD-ERS — provide full float, quick tool changes, a variety of shank types and sizes, including an adjustable adapter shank.

SHUR-LOCK AD-JUSTABLE ADAP-TERS — built to GMC, Ford, Chryster and ASA standards. Concentricity .002" TIR 6" from nose. Sturdy, dependable.

SPINDLE EXTEN-SIONS — provide individual spindle edjustment and extend or after existing multiple setups without extensive retaaling outlay.

DRIVERS — hardened, ground, precision built, concentric within .002". Made to automotive, ASA standards. Alltypes and sizes.





UPPER AND LOW-ER DRIVE ASSEM-BLIES — sliding shafts and sleeves of fine materials, ground for accurate fit. Keys and keyways held to close tolerances. Other important features, including Seibert Universal Joints.

SPINDLES, SPINDLE BRACKETS, ARMS—these units available for replacement or as original equipment. Sturdy design, accurately machined.

PINION DRIVE SHAFTS — upper drive shafts of alloy steel, carefully heat-treated. Ball ends prevent injury to threads.

SLIP-SPINDLES for cluster-plate applications. Widely used on multiplespindle drilling machines. Accurate, dependable.

UNIVERSAL JOINTS
—aircraft type with
alloy steel forks,
center blocks, and
pins . . . carefully
heat-treated. Provision for maximum lubrication.

TOOL HOLDERS

You can depend on Seibert's skill and practical tooling experience for new ideas in production holding tools that offer cost-cutting advantages. In addition, you can be sure of fast, economical, direct-factory service. All holders are lot produced, and 100% inspected. They meet the exacting requirements of prominent machinetool and other builders.

TOOL CONTROL BOARDS

The Seibert Tool Control System includes tool boards, cyclometers, and presetting gauges, all designed to suit your production requirements. Panels are subdivided into sections for each type of tool, and divisions are arranged as required, with space for sets of tools for each job. The system has many advantages in addition to the reduction of downtime.

SPINDLE EQUIPMENT

Seibert Bracket Spindle Assemblies, Slip Spindles, and their components are helping hundreds of machines maintain precise accuracy, whether the parts or assemblies are original equipment or replacements. Balanced design, precise machining, and careful heat-treating are some of the reasons. Seibert's specialization provides quick service, too.



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CP-3440-TS adjustable torque range 15 to 80 ft-lbs. ½" square drive.

TORQUE CONTROL IMPACT WRENCHES

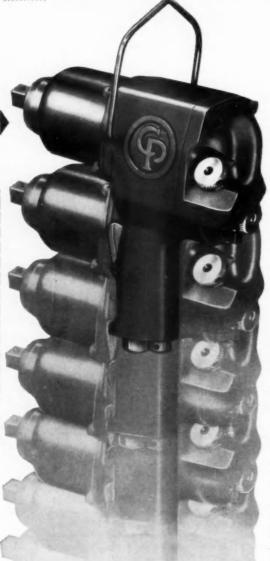


CP-3630-RTP adjustable torque range 100 to 350 ft-lbs. 3/4" or 1" square drive.



CP-610-RTP adjustable torque range

A complete line of Torque Control Screwdrivers and Nutrunners solve other threaded fastener torque problems. Available from No. 4 screw size to %" bolt size.



More and more top-flight manufacturers are realizing that proper bolt tightness is a quality factor that gives them a sales edge over competitive products . . . their assembly line foremen know that the use of TORQUE CONTROL IMPACT WRENCHES in the driving of nuts and bolts to "correct torque" means:

- · Less work spoilage
- No chance of sheared bolts or stripped threads
- Inexperienced operators learn nut running operations faster
- · Less product failure

CP Torque Control Impact Wrenches give you the exact tightness you want in a fast, accurate, "one-shot" rundown that doesn't require a hand torquing follow-up to check work accuracy. Torque ranges from 15 to 600 foot pounds available.

Let a CP Fastener Specialist work with you on your problems. You'll be impressed by the easy handling qualities of these unusually compact tools. The torque control mechanism is totally enclosed and all torque adjustments are made quickly AND simply without special tools or fixtures. For further information, contact your nearest CP Office, or write: Chicago Pneumatic Tool Company, 8 East 44th Street, New York 17, N. Y.

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resistance for the control of the co TYPICAL APPLICATION Rivert reducing valves the BIBLE" **FLUID** POWER! New authoritative instruction manual describes pressure controlled hydraulic valves-information never before published! You will find this complete and factual material extremely valuable for planning a modern hydraulic circuit! Written by engineers long experienced in fluid power design, this new 81/2 x 11 book shows operations and applications of all pressure controlled valves - relief, sequence, reducing, unloading and counterbalance.

For your free copy of Catalog No. 230, write on company letterhead to A helpful guide to selecting the proper valve for the job, Rivett's new Catalog No. 230 discusses in detail all factors influencing correct choice: normal spool position, operating pressure source, pilot or direct operation. Also shown are flow diagrams, pressure vs. flow curves, ratings, dimensions, drawings and specifications.

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Member-National Fluid Power Association

HOW TO SELECT FLEXIBLE SHAFTING FOR POWER DRIVE APPLICATIONS



11/4-inch STOW Power Drive flexible shaft with core assembly pulled out of casing.

For Power Drive applications, the following factors must be considered:

1. Torque (Lb. In.) to be transmitted (The starting torque should be used in making selections.)

2. Congreting Speeds (RPM) If the

making selections.)

2. Operating Speeds (RPM)—If the maximum speed is higher than the rated speed, torque ratings in the table below do not apply. To find the torque capacity for flexible shafts operating at speeds higher than the rated speeds, multiply the maximum dynamic torque capacity by the rated speed, and then divide by the operating speed. (See example.)

3. Operating Radius - In making the selection from the table below, the radius of the smallest band in the flexible shaft should be used.

Ratings — The ratings for flexible shafts shown in the table below apply under the following conditions:

I. when the flexible shaft is adequately supported by clamps along its length. (For unsupported shafts, multiply the calculated torque by a safety factor of 1.6—see example below.)

 when the flexible shaft is operated in the wind-up direction, which tends to tighten the outer layer of wires. (Flexible shafts operated in the unwind direction will transmit only about 60% of the rated torque.)

3. when the flexible shaft is in continuous operation. Note: the ratings are based on temperature rise. When the operation is intermittent, the ratings in the table may be exceeded. Consult Stow engineers for specific recommendations.

			MAXIN	AUM DI	NAMIC	TORQU	E CAPA	ACITY (L	B. IN.)				
RATED				STRAI	GHT AN	D CUR	VED SH	AFTS		Wat./	Core	Core No.	1 3
SPEED				RADIUS	OF CU	RVATUE	E IN I	NCHES		C. Ft.	Die.	and Type	Sheft
R.P.M.	50 to Strgt.	25	20	15	12	10	8	6	5				
4,500	2.4	2.2	2.0	2.0	1.92	1.9	1.7	1.5	1.25	3.0	.124/.128	2049 MH	13
3,800	7.0	6.4	6:0	5.8	5.4	5.0	4.6	3.6	2.0	4.5	.148/.152	2081 MH	15
2,900	9.4	8.6	8.0	7.6	7.0	6.6	6.0	4.8	3.4	7.0	.185/.189	5108 MH	19
2,500	22.0	20.0	18.8	17.6	16.0	15.0	12.6	10.8	9.0	12.5	.247/.252	8924 MH	25
1,800	30.0	28.0	26.4	25.0	23.0	21.0	10.0	14.0		20.0	.308/.313	8925 MH	31
1,800	33.8	31.5	29.7	28.1	25.9	23.6	20.2	15.8		20.0	.308/.313	8969 T	31
1,800	36.0	33.0	31.6	30.0	28.0	26.0	22.0	18.0	11.0	21.0	.324/.329	2034 A	31
1,500	80.0	66.0	63.0	58.0	51.0	46.0	37.0	22.0		28.5	.368/.374	2035 A	38
1,500	60.0	54.0	50.0	46.0	42.0	38.0	30.0	24.0		29.0	.387/.393	8970 MH	40
1,500	90.0	81.0	75.0	69.0	63.0	57.0	45.0	36.0		29.0	.387/.393	8971 T	40
1,150	136.0	110.0	104.0	94.0	80.0	72.0	56.0			50.5	.497/.503	8999 A	50
1,150	148	124	110	92	72	56				53.5	.505/.511	6940 T	50
900	248	200	176	124	84					78.5	.610/.618	6997 T	63
900	220	204	192	180	152	130				80.5	.630/.638	7731 A	63
750	340	224	156	76						117	.747/.753	2056 T	75
600	760	520	420							205	.998/1.004	2057 T	100
440	1,500	720								343	1.298/1.304	2058 T	125

EXAMPLE—How to use the table: The problem is to trammit ½ H P at 1700 RPM through an unsupported floxible shaft in a 25" radius, estimated starting torque 150% of normal operating torque.

- f. Cale. Terque (lb. in.) HP x 63000 = .5 x 63000 = 18.5 RPM = 1700
- 2. Correction factor for starting torque 1.5 x 18.5 = 27.75
- 3. Correction factor for unsupported shaft $27.75 \times 1.6 = 44.4$ lb. in.
- i. Refer to Table above. Read dewnward in selume under 25" radius until you find a core baving a rating of at least 44.4 lib. in. In this case we find that ears No. 8970 in rated 54 lib. in. 1500 RPM. Since the given speed in 1700 RPM, molitely 54 by 1500 and divide by 1700. 54 × 1500 1700 RPM, Therefore, Care No. 8070 is cerreet.

For Engineering Bulletin No. 570 and a free torque calculator, write



STOW MANUFACTURING COMPANY

393 Shear Street

Binghamton, New York

METALS

(Continued from page 120)

Difficult Copper Situation

While the July statistics of the Copper Institute were no better. and no worse, than expected by the trade, they gave no basis for the enthusiastic advance in copper futures that was witnessed in mid-August. Briefly, world refined production exceeded world deliveries to fabricators by over 43,600 tons in July and world stocks increased by about the same amount. This was in sharp contrast with the far more cheerful picture in June when deliveries exceeded production by nearly 10,000 tons and stocks declined 5000 tons. July deliveries were the lowest in 1959 and stocks at the end of the month were at the year's highest figure.

Short Term Outlook For Higher Prices

Admittedly if this were all to the copper picture it would furnish poor pickings for copper bulls. But definitely this isn't the case. The poor July statistics reflect water over the dam. By mid-August the copper situation changed radically from a position of over production here and abroad to threatened scarcity of metal as an industry-wide strike of U.S. copper producers appeared certain. By mid-August the Kennecott and Magma miners were on strike, with Anaconda and Phelps Dodge scheduded to follow. The combined normal output of the four mines already struck or threatened is about 73,000 tons a month, or about 75 per cent of the total U.S. mine production. This would reduce world mine production on a monthly basis to little more than 200,000 tons or about 65,000 tons less than the average monthly deliveries for the January-June period of 1959. Unless copper demand drops drastically this could mean higher prices in London and in New York for copper over the near term.

(Turn to page 128, please)

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Observations

By Joseph Geschelin

Engine Progress

Judging by what we have seen to date the great horsepower race is gone at long last. Most new cars are striving for smoother, more economical operation, and some will offer frankly economy engines. One interesting note: one of the lines has discarded fourbarrel carburetors and will employ two-barrel carburetors on all engines. They claim this gives better economy in the driving range; comparable performance from 60 to 70 mph.

Front vs Rear

The highly technical distinctions between conventional drive and rear engine drive now are being debated for the benefit of the man on the street. The same debate-but within industry circles -was common some 15 years ago. Many of the disadvantages of rear engine cars are negligible if the powerplant is small and light. In fact, we turned up a discussion prepared for our benefit many years ago which concludes that there are no disadvantages if the powerplant is 200 cu in. or less and is light-weight, i.e., made of aluminum. The only comment we can make at this point is that if the first of American-made rear engine cars is successful and if others follow suit, the proponents of front engine mounting will find many good reasons for shifting to a rear engine location.

Unitized Rodies

Earlier conjectures about the introduction of unitized bodies on a number of makes of cars have been amply confirmed. At the proper time you will find that quite a number of 1960 cars will have the new bodies, eliminating the chassis frame, and changing the entire car assembly operation.

AUTOMOTIVE INDUSTRIES
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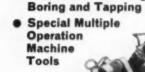
MOLINE

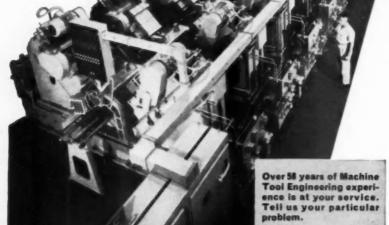
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Twenty-Station, Ten-Unit Transfer Machine for boring, counterboring, chamfering and valve clearance operations on V-8 automotive engine blocks. (Shown above)



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FIRESTONE GIVES YOUR CARS NEW "COME ON" WITH fashionized ALUMINUM PARTS

Call on Firestone's fabricating and finishing abilities in mass-producing colorful, low-cost parts and trim for automotive products.

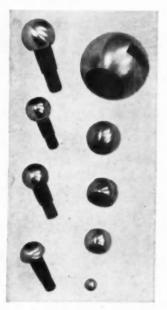
Call on the brightest brightwork in the business to turn comparison-shoppers into your new customers. Call on the eye-catching colors and qualities of aluminum formed and *Fashionized* by Firestone to supply new competitive appeal inside and out.

Call on Fashionized® Aluminum, and on Firestone's more than 50 years of metal-fabrication experience. Call, too, on the production capacities and competitive prices that only an automated anodizing line can supply—in part sizes up to seven feet long. Your inquiries and inspections are cordially invited.

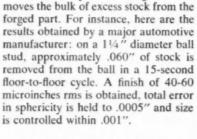
FIRESTONE FASHIONIZED ALUMINUM FIRESTONE STEEL PRODUCTS COMPANY, AKRON 1, OHIO

PROCESSING TRUNCATED SPHERES BY MICROMATIC METHOD IS FASTER, ECONOMICAL AND MORE ACCURATE

Machining of accurate truncated spheres has long been a design and production problem. The root of the problem lies in the fact that as a single point tool generates a spherical surface, the surface speed varies widely. To eliminate this problem, Micromatic has developed a fast, two-operation technique that assures uniform surface speed when machining any type of truncated sphere.



The above ball studs and other truncated spheres are typical of parts that can be processed faster, to closer tolerances and at lower cost with Micromatic machines and tooling.



First, a special cutting tool re-

Microhoning is the second operation. In a 24-second floor-to-floor cycle, it removes final .002" of stock from the ball to generate required size, a finish of 6-10 microinches rms, sphericity within .0003" and a functional crosshatch lay pattern.



Typical ball stud processing—(A) heat-treated forging, (B) after Micromatic cutting tool operation, (C) finished ball stud after Microhoning.



See facing page for further details on how Micromatic processing of truncated spherical surfaces secures the above results.

MICROMATIC HONE CORP. B100 SCHOOLCRAFT AVENUE . DETROIT 38, MICHIGAN

METALS

(Continued from page 124)

No Shortage Over the Longer Term

Over the longer term there is no shortage indicated for copper. This situation was recognized by Phelps Dodge and Rhodesian Selection Trust who curtailed their mine output because of threatened oversupply. Very likely this policy would have been followed by other producers if the strikes had not intervened. But even five weeks' shutdown at the mines, and the strikes could last longer than that, would mean that U.S. producers stocks, now 103,432 tons, would be virtually exhausted. Before this happens it would be necessary to call for larger imports from abroad. As London is currently offering copper at the equivalent of 2934 cents, or about 3134 cents delivered in N. Y., it indicates the New York price would have to approximate this level to attract supplies from abroad.

Reflecting the tightening near term position, the smelter price was raised to parity with the producers 30 cent level in mid-August after having previously been cut ½ cent below the latter. Business was done by dealers at 321/2 cents for spot metal but consumers were hesitating to buy at that level. It is generally believed that consumers are well supplied for current needs and fabricators' stocks are high. As a further deterrent to any runaway copper price is the ever present possibility of Government sales from the stockpile which might be considered in case of a dire scarcity of the metal.

Lead in Good Demand

While lead in London continues to sell about 1¾ cents a pound less than zinc, the contrary has been true in New York. Demand for lead has been good and sales in mid-August were the highest since April. Labor unrest and lower inventories reported by consumers led speculators to expect a price rise and futures advanced smartly. The most recent industry statis-

tics revealed a substantial drop in U. S. stocks. On top of this is the likelihood of strikes at the lead mines and smelters, following the example set by the copper workers. Imports of lead in all forms have been less than the monthly average in 1958.

Another Government Survey of Lead and Zinc

There appears to be considerable likelihood that the Tariff Commission will do an entire industry survey of lead and zinc covering both ores and products. Much dissatisfaction has been shown over the quotas now in force on imports, which may be tightened. All of which adds up to anticipation of higher prices for both metals above London levels. Consumption in the United States will probably rise 15 per cent this year for zinc and 10 per cent for lead, but world output will still exceed demand unless more curbs are put on production abroad. It appears this may be entirely possible.

Zinc Sales Off in July

Quite as expected, the July statistics for zinc were poor. Shipments to domestic consumers slumped about 40,000 tons from the record high in June and stocks increased 13,000 tons to 182,000 tons. These figures reflected directly the result of loss of orders from the strike-bound galvanizers. No doubt the high shipments in June were sparked by considerable inventory buying to hedge on the strike as well. If the steel strike continues, lower zinc shipment probably will result. In 1956, at the time of the strike, deliveries dropped to 33,600 tons in July.

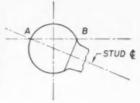
Pick-Up in August

Hence it is surprising that August sales of zinc have held up well in spite of the steel strike. Two of the important steel mills are only partially struck and have continued to call for regular shipments. Galvanized sheets have been in extremely tight supply, and brass mills and diecasters have shown good buying interest.

(Turn to page 150, please)

PROCESSING TRUNCATED SPHERES BY MICROMATIC METHOD ASSURES ECONOMY, SPEED AND ACCURACY

As an example, here's how Micromatic equipment in two fast operations machines 1¼" diameter forged ball studs. For both operations, the ball stud is located on the taper, clamped in the thread and positioned on an inclined axis. Thus the center of the ball crown (A) and the intersecting point of sphere and shoulder (B) are in a horizontal plane.





excess stock from forged ball stud.

The first machining of ball stud is a cutting operation. A special Micromatic cutting tool, that is U-shaped at the cutting end, is used to assure constant cutting speed over every point of the ball. Two round carboloy blades are clamped in the tool—clamp also acts as a chip breaker. With blades positioned in a counterbore, no adjustments are required. Size is controlled within .001" by depth of feed, set by an adjustable stop. Blades may be turned or reversed to give several usable cutting faces. Also, since they are throw-aways, these blades offer additional economies. Approximately 2,000 balls are machined with each set of blades. In a 15-second floor-to-floor cycle, the cutting operation is completed—total error in sphericity is held to .0005".

The ball is then Microhoned. The combination or rotating motions of workpiece and the special Microhoning tool results in a functional cross-hatch lay pattern and makes the abrasive self-dressing. In a 24-second floor-to-floor cycle, Microhoning generates required size, sphericity within .0003" and a finish of 6-10 microinches rms.



For Further Information, Write To:



SECOND OPERATION: Microhoning ball stud to secure final size, sphericity and finish. Single spindle machines also available.

MICROMATIC HONE CORP.

B100 SCHOOLCRAFT AVENUE - DETROIT 38, MICHIGAN

ON OUR WASHINGTON WIRE

Communism has no wish to reduce the world to ashes, says Allen Dulles, CIA head. For this reason, he explains, we can expect the Reds to pursue the cold war and to stop just short of starting an atomic war. Despite occasional missile-rattling by Red leaders, long-range Soviet policy is to gain as much as possible without actually firing any shots at the U.S.

Army and Navy chiefs, nettled at the big gains in Air Force funds, are again urging the Congress to vote dollars for more nonatomic weapons. Air Force, so the complaint runs, is simply developing an enormous capacity for "overkill."

Excess capacity in missiles to destroy whole areas of the globe will be useless in fighting oldfashioned (Korea-type) wars. where rifles and howitzers are

needed, it's argued. Big question: Will the Reds engage in any more so-called "limited" wars? If so, the U.S. Army and Navy will rise again in size and prestige.

The U.S. may begin design and construction of a nuclearpowered plane in the current fiscal year. Many congressmen and military leaders favor starting now on a test plane, without waiting for engine and airframe performance which will meet military requirements. Continued delay will cost more and waste time, they say. Note this: The new military budget has enough 'flexible" funds to get work underway.

We'll hear of more scandals in foreign aid, not fewer, in the months ahead. Newspaper reports of corruption in U.S. handouts for Viet Nam have prodded the Sengte to look further into

the \$4 billion-plus annual tab for overseas help. And foreign-aid officials are weakening their own case by denouncing all criticism as "lies."

The possibility of a national sales tax is in the news again. Ike's new Secretary of Commerce, Frederick H. Mueller, is making it clear that as long as government revenue needs are high, he intends to fight for equalization of the present hode-podge of excise taxes. What this means, of course, is a broad national sales tax, applying to all manufactured products except possibly food, and collected at the manufacturing level.

Joel Barlow, Washington tax expert, puts it this way: "The Government has reached the limits of potential in personal income taxes and corporation income taxes. These sources are mined out. A national sales tax is our last untapped source. Sooner or later we will have to start paying for the cold war, and a national sales tax will then become inevitable."

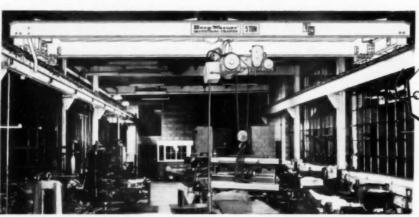
PRODUCTION WISE and COST CONSCIOUS!

Borg-Warner quality assures you of top value in every capacity,

performance and price range



for a 5-Ton, 22 Ft. Span, Top Running Single Girder, Motor Driven Crane complete with a 2-motor heavy duty double reeved hoist.



PRODUCTION WISE . . . There's no room in this busy shop for COST CONSCIOUS . . . B-W Industrial Crane's aisle-filling floor-type handling equipment. But, an economical B-W use of standardized, interchangeable compon-5-Ton Crane System moves materials and work swiftly, smoothly ents means real savings for you. You get and quietly without interference to production.

more crane, more performance and greater dependability for a smaller investment.

Design it better . . . Make it better.



Borg-Warner industrial cranes

1574 SOUTH PAULINA, CHICAGO 8, ILLINOIS Export Sales: Borg-Warner International, 36 South Wabash Ave., Chicago 3, Illinois

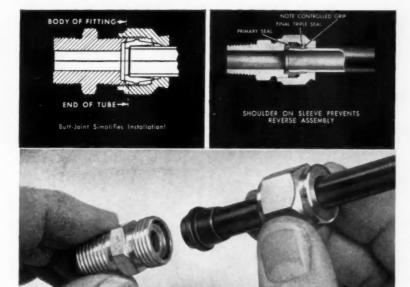
Dependable Quality

- . Full 5-Ton rating.
- . B.W Motor Reducer Bridge Drive
- with integral fluid coupling.
- · Heavy duty double reeved hoist. · Heavy duty forged steel wheels.
- . Jig bored, jig assembled end trucks.
- . Long life precision bearings. · Girders and end trucks assembled
- with fitted bolts in reamed holes.
- · Machinery girder construction. · Full magnetic push button control.

Advanced Design

A typical B-W Top Running Single Girder Motor Driven crane is illustrated. Consult with Borg-Warner Industrial Cranes engineers for the precise equipment to meet your need.

INSPECTING and Data File | ENGINEERED TUBE FITTINGS - VALVES - TUBING TOOLS



How Hi-Seal tube fitting design simplifies hydraulic circuit installations

The butt-joint feature of Hi-Seal fittings is a design consideration acclaimed by fitting users throughout industry. The tube does not enter body of fitting! It bottoms on the shoulder of the sleeve. This butt joint feature makes possible far more compact piping layouts than other fittings.

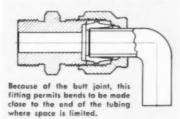
Users have obtained these benefits:
(1) cuts space requirements up to 50%; (2) reduces number of bends required; (3) cuts man hours and installation time; (4) substantially reduces the amount of tubing needed.

Hi-Seal design eliminates the need to spring tubing. This is important when working with large diameter, heavy wall or hard temper tubing. And bends can be made closer to end of tube than with any other fitting.

FOOLPROOF ASSEMBLY — Anyone can make leakproof connections with Hi-Seal fittings. There is only one way to assemble the Hi-Seal fitting . . . only one way tubing can go into sleeve . . only one way sleeve can go into fitting.

go into fitting.

Hi-Seal design also makes maintenance of equipment easier through quicker disassembly and assembly of



joints - may be disconnected and reconnected as often as desired.

complete line — Hi-Seal fittings are available in brass, steel, stainless steel. Also can be furnished in Titanium. Tantalum and other metals. Steel fittings supplied with cadmium plate or black phosphate finish. Conform to J.I.C., A.S.M.E. and A.S.A. standards. In sizes for ½" to ½" O.D. tubing. Furnished with Long Dryseal pipe threads or straight thread port seal.

Write for Bulletin No. 3061

THE IMPERIAL BRASS MFG. CO.

6300 W. Howard St., Chicago 48, Illinois In Canada: 18 Hook Ave., Toronto, Ontario



New high-pressure valves assemble directly to tubing, eliminate additional fittings



A revolutionary new line of Imperial needle valves designed for working pressures up to 5,000 psi., and temperatures to 450° F., employs Hi-Seal tubing connections.

These valves attach directly to tubing and eliminate additional fittings. This not only reduces cost but cuts installation time and eliminates principal source of leakage.

For low pressure service, Imperial also supplies a complete line of fluid control valves in diaphragm, plug, (2, 3, and 4-way styles) — needle and toggle types.

Write for Bulletin 3096, or Catalog No. 200



Distribution problems solved with Hi-Duty 2, 3 and 4-way valves

Imperial Hi-Duty valves offer maximum protection against leakage, assured by closed bottom, seal on top of valve and "O" ring seal on stem. And they're full flow. Passages are

And they re full flow. Passages are equivalent to the I.D. of the tube or pipe connected. Made from brass forgings and have long dryseal pipe threads.

Imperial also offers needle, plug,

toggle and diaphragm types.

Write for Bulletin 3061 and Catalog 200

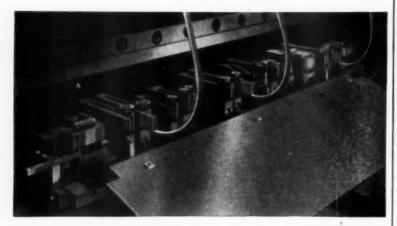
CONTACT	YOUR .	INDUSTRIAL
DISTRIBUT	OR OR	WRITE TO:

Dept. Al-99, 630 Chicago 48, III.		
Please rush me: No. 3096	Bulletins	O Cat. No. 20
Name		
Title		
Company		
Street		
		State



... stake nuts permanently with every press stroke!

NEW



STRIPPIT PIERCE NUT UNITS save operations, time and money in assembly panel production with single-strok. insertion of Fabristeel Multipierce Nuts* into sheet metal up to .125" thick.

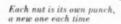
Permanent Fastening by an Exclusive New Process—as nut pierces stock, metal flows into nut shoulder slot, becoming an integral part of the stock.

High-Speed-fast press setups, automatic feed of nuts to units for long, medium or short runs gets maximum production per press.

Flexibility-Pierce Nut Units can be quickly press-mounted in any desired pattern, changed on short notice, re-used over and over.

*A Product of Fabristeel Products. Inc.







Die button causes material to flow into nut slot



Simultaneous embossing for flush fastening

WRITE FOR DEMONSTRATION on your press! The speed and simplicity of Strippit Pierce Nut operation has to be seen to be believed. Also request new catalog for complete specifications.

242 Buell Road, Akron, New York

In Canada: Strippit Tool & Machine Company, Brampton, Ontario



The average advertising cost of each automobile sold in 1958 was \$34.52, compared with \$30.69 in 1957.

Among U.S. passenger cars, Ford had the lowest ad cost per car-\$22.90-and Chevrolet was second lowest with \$23.90. Third lowest was American Motors with \$26.17 for Rambler.

Highest ad cost per car was \$195.20 for the Edsel, followed by \$134.42 for Lincoln.

More than a billion pounds of lubricants were produced in the U. S. and Canada in 1958.

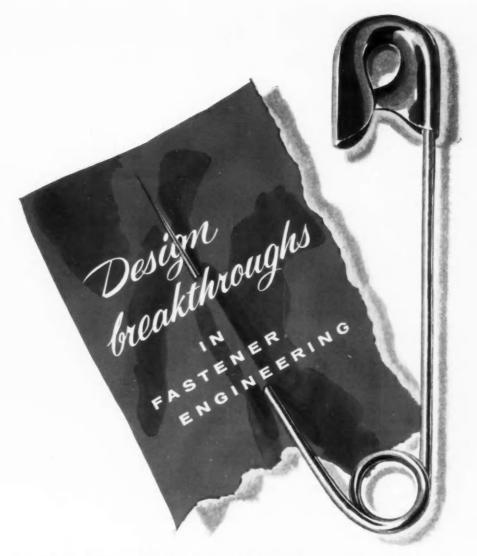
In 1958, U. S. colleges and universities had an estimated income of \$4.4 billion, of which more than \$850 million came from voluntary contributions, including about \$136 million from corporations.

In 1959, companies will give about \$150 million, or almost four times the \$40 million they donated in 1953.

During the first quarter of 1959. the load factor (number of passengers compared with number of seats available) of scheduled airline operating turbojet planes was 90 per cent, compared with 60 per cent for piston aircraft.

Landings and takeoffs at the 213 traffic control centers operated by the Federal Aviation Agency totaled 26,599,719 in 1958 -a six per cent rise over the previous year.

Today's TV set contains 8000 parts per cubic foot. Goal of the aerospace industry in miniaturization is 600,000 parts per cubic



One of the earliest and most basic breakthroughs in fastener design was the common safety pin. And, although DOT is not a manufacturer of safety pins, many a DOT industrial fastener has had an equally revolutionary effect on modern fastening technique. Hundreds of different DOT fasteners have created relatively minor revolutions in specific industries.

A DOT fastener may save a few manminutes of labor. It may save material. Or it may improve product performance and hence saleability. But multiply each small improvement by the number of units in a true mass-production operation and the savings really pile up to impressive proportions. Rather than spend your own design staff's time on fastening problems, it might pay you well to call in DOT. You'll have at your service a design and production organization with large-scale facilities for genuine mass-production of special-purpose fasteners and self-fastening devices of all kinds.

Supplementing the Carr Fastener Company are a number of other plants which form the United-Carr Fastener group. They are located in the principal production centers of the United States, Canada, England and Australia. Your nearest United-Carr Field office (see below) is no further away than a telephone call from your desk.



CARR FASTENER COMPANY

Cambridge 42, Massachusetts

Offices In:

Atlanta, Boston, Chicago, Cleveland, Dallas, Detroit, Los Angeles, New York, Philadelphia, Syracuse



Here's how

JOB-PROVED TY, BRUSHES

are cutting metal-finishing costs across the board



Application: deburring



Application: Surface finishing



Application: wire insulation stripping

In use today on a wide range of applications
—Osborn TY_⊕ Tool Brushes are engineered to cut finishing costs. New TY Brushes are designed for jobs beyond the reach of standard wire power brushes.

Where rotary files, abrasive stones or belts, tumbling and shot blasting equipment have been used—TY Brushing Methods now do many of these jobs better and faster . . . at significantly less cost.

Do you know which operations in your plant can be done at high production rates . . . with better quality control . . . at less cost with new TY Brushes? An Osborn Brushing Analysis—made in your plant now at no cost—is the first step. Write for full details.

Exclusive TY Brush advantages performance proved on-the-job:

- Maximum of work efficiency with minimum of pressure.
- Greatly increased brushing action strength.
- · Positive control over area of brush contact.
- · Complete uniformity of finish.
- Exceptionally long brushing tool life.

Write For Free TY: Brush Booklet...complete, illustrated application and specification data for production men. The Osborn Manufacturing Company, Dept. E-82, Cleveland 14, Ohio.



POWER, PAINT AND MAINTENANCE BRUSHES
METAL FINISHING MACHINES...AND FINISHING METHODS
FOUNDRY PRODUCTION MACHINERY



(Continued from page 13)

ADHESIVE BONDING

Your interesting presentation on "Cutting Costs with Adhesive Bonding" in the July 1 and July 15 issues should stimulate thinking which could multiply present usage of adhesives not only in the automotive field, but in all areas of industry.

James McCready Public Relations The B. F. Goodrich Co. Akron 18, Ohio

In Part II of your very fine article "Cutting Costs with Adhesive Bonding," published in the July 15 issue of AUTOMOTIVE INDUSTRIES, you indicate adhesives are being used on aluminum engine blocks. We would appreciate further data as to types of engines and application history.

John Mikulah Assistant to Vice President of Manufacturing Worthington Corp. Harrison, N. J.

DO-IT-YOURSELF CAR

A news item in the May 1st issue of Automotive Industries (page 18) concerning the Noble 200 doit-yourself car has come to my attention. I am interested in knowing the name and address of the nearest distributor, if any, and any additional information available.

Name Withheld Dallas, Tex.

◆ To the best of our knowledge, the manufacturer of the Noble 200 has not announced as yet any distribution setup in the U. S. World distribution is handled by York Noble Industries, Ltd., Park Lane, London, England. Suggest you contact them for further information.—Ed.

(Turn to page 136, please)



SPRAY PAINTING NOTES

New Pumps Force Paint Thru Over a Mile of Line

For extra high volume industrial paint circulating systems, the new "Kayo" series of air-operated pumps supplies up to 55 spray gun stations thru over a mile of pipe line.



This automotive plant paint storage room Binks Kayo 32 pumps mounted in standpipes. Note the compact area required for this paint circulating system which supplies 16 identical matched colors to 55 different spray stations.

The largest pump, the Kayo 32, de-livers one gallon of paint every two pumping cycles using a 10-inch stroke. Operating on an automatic demand principle, the pump has its own built-in control. It promptly adjusts its own pumping rate to give an even, regulated flow of paint at each spraying station, regardless of the number of spray guns in use.

The Kayo 32 delivers paint on both up and down strokes. It can deliver high capacity at relatively slow speeds assuring a longer life and less maintenance.

Engineered to deliver more material at less air consumption, the motor requires only 2 cfm per gallon of paint pumped at 80 psi. Air motor and pump are completely space separated so that paint can't possibly en-

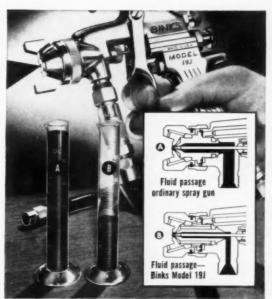
ter the motor. Exclusive Auto-Cycle Air Valve operates under even the most adverse conditions. It's no longer necessary to disassemble entire air motor for valve maintenance. Just the air valve easily slips out as a unit for serv-

icing.
Air motor piston cups are self-oiling so that pump never requires oiling. Pump castings are of high density alloys. Double tube construction keeps moving parts in rigid, per-manent alignment. All metal parts subject to rust and corrosion are electroplated. Simple pump design permits easy in-plant replacement of parts if and when required.

"Kayo" pumps are manufactured by Binks Manufacturing Company,

3120-30 Carroll Ave., West, Chicago 12, Ill. Complete information on these

pumps is available.



65% savings in paint!

O To clean-out a conventional spray gun after transferring to another paint line, 7 to 10 ounces of paint must be "bled" to prevent a color inter-mix.

1 Only 2 to 4 ounces of "bleed-out" paint are required to clean-out the new Binks Model 19J spray gun - o 65% material savings.

New Binks spray gun for circulating systems

Cuts clean-out costs 65% when changing colors

Plants using multiple-color paint circulating systems frequently shift spray guns from one color line to another. To clean the old color out of the spray gun the new color must be run through the gun (and quick detachable hose connection) until there is no danger of inter-mix. Paint lost through this "bleeding" operation runs between 7 and 10 fluid ounces.

New spray gun cuts "bleed" losses almost 65%. Binks Model 19J spray gun, when used with the same quick detachable hose connection, slashes "bleed-off" losses. Only 2 to 4 fluid ounces must be passed through the passages to make certain there is no inter-mix to cause a finish reject.

Unique design features. Binks Model 19J is an efficient, dependable production spray gun in every respect. Its paint saving characteristics are achieved through two unique in-

ternal design features. Design feature number one greatly reduces the amount of paint contained between material inlet and nozzle orifice over that contained in conventional spray guns. Feature number two eliminates all "pockets" in the gun head which can trap paint. This also contributes to faster cleanout with less waste

Automatic model available. Binks Model 21J is an automatic spray gun, triggered by air pressure. On automatic painting machines it provides the same paint saving economies as the Model 19J.

All the facts in Bulletin RFG

Get the complete story on these two new Binks spray guns. Ask your Binks industrial distributor for a copy or write direct to the address below.



Ask about our spray painting school Open to all...NO TUITION...covers all phases.









Binks Manufacturing Company 3120-30 Carroll Ave., West, Chicago 12, III.

REPRESENTATIVES IN PRINCIPAL U.S. & CANADIAN CITIES . SEE YOUR CLASSIFIED TIPE DIRECTORY

LETTERS to the Editor

(Continued from page 134)

MARINE ENGINES

The following comments by a leading manufacturer of marine engines arrived too late for inclusion in the article "Major Gains Seen in Marine Inboard Engine Field," published in the August 15 issue of AUTOMOTIVE INDUSTRIES. They are presented here as supplementary information.—Ed.

Our volume of horsepower produced during the first five months of 1959 is up 80 per cent over the same period of 1958. Naturally, not all of this percentage increase

is applicable to the Marine portion of our business, but I believe it is safe to say that our Marine business is up in proportion to the total business.

The demand for the GM Diesel engines has had a very definite influence on product design and the range of power. Our horsepower spread now runs from 20 to 1650 hp, as compared to 30 to 893 hp before the introduction of the GM Diesel All-Purpose Power Line. The Marine business was largely responsible for some of the basic thinking that went into the design of our new lightweight Series 53 engines and the compact new V8's, V12's, and V16's in the Series 71 line.

GM Diesel's plans for product development in the Marine field revolve around refining the new engines for marine use. For instance, we are now engineering the 4-53 engine for use in an inclined position to give a lower profile for Marine use.

We feel that the Marine Pleasure Craft market is certainly a growing and glowing one and that GM Diesel power will find its way into more and more pleasure craft. The results we have had with our new engine line in Marine installations thus far have been more than gratifying to both GM Diesel and the hoat owners.

> Name Withheld Detroit Diesel Engine Div. General Motors Corp. Detroit. Mich.

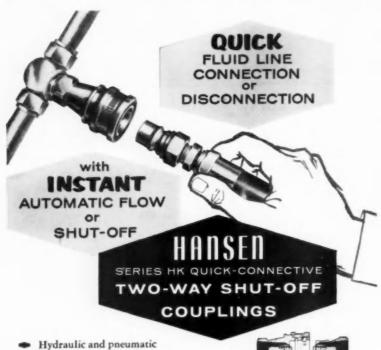
EQUIPMENT LEASING

We are interested in learning more about the plan described in the article "Equipment Leasing Gains in Automotive Industries," published in the June 15 issue of Automotive Industries and written by Mr. Robert Sheridan of Nationwide Leasing Co. We are unable to locate the address of this company and would appreciate your forwarding the enclosed letter of inquiry to them.

T. B. Burke Integrity Supply Inc. City Park & Thurman Aves. Columbus, O.

Nationwide Leasing Co. is located at 1 North LaSalle St., Chicago, Ill.—Ed.

AUTOMOTIVE INDUSTRIES
KEEPS YOU INFORMED



 Hydraulic and pneumatic lines are quickly and easily connected with Hansen Two-Way Shut-Off Couplings. No tools required.

When Coupling is disconnected, valves contact valve seats in both Socket and Plug to provide instant and positive seal of fluid in both ends of line. Coupling does not depend upon line pressure to seal either end of line.

Six sizes are available, with female pipe thread connections from 1/8" to 1" respectively. Furnished either in steel or brass.

Representatives in Principal Cities
... See Yellow Pages



Instantly shuts off both sides of line... prevents loss of liquid, gas or pressure.

Quick-Connective Fluid Line Couplings for COMPRESSED AIR • OIL GREASE • HYDRAULIC FLUIDS WATER • VACUUM • STEAM OXYGEN • ACETYLENE REFRIGERANTS • GASOLINE COOLANTS • LP-GAS



Write for the Hansen Catalog
Here is an always ready reference
when you want information on
couplings in a hurry. Lists
complete range of sizes and
types of Hansen One-Way
Shut-Off, Two-Way Shut-Off, and
Straight-Through Couplings.

E HANSEN MANUFACTURING COMPANY



Diluted cutting oil can pile up rejects

When you find your scrap production soaring, the villain may be lube oil leaking into the cutting oil sumps of your automatic screw machines. It happens in 7 out of 10 automatics in spite of the most careful lubricating techniques. This dilution will lower cutting oil effectiveness—and, as it loses its efficiency, rejects pile up, tool life drops, and production can go down by as much as 33 per cent!

Texaco Cleartex can solve the problem—forever!

Because of its exceptional stability and load-carrying ability, Cleartex can function both as a cutting oil and as a lubricant—and even as a hydraulic fluid. When all your automatics' sumps are filled with Cleartex, unavoidable leakage is no longer a problem. Excessive scrap production will stop, tools will last longer and production will go up.

TAKE THE "CLEARTEX CURE" SOON!

Write today for your copy of Texaco's new booklet—"Cleartex in Automatic Screw Machines." This new illustrated guide will fill you in on the details, show you where you may be losing profits and how to avoid it. Or contact your local Texaco Lubrication Engineer for an authori-

tative survey of your automatics. Just call the nearest of the more than 2,000 Texaco Distributing Plants, or write:

Texaco Inc., 135 East 42nd Street, New York 17, N. Y., Dept. AI-33.

* * *

Tune In: Texaco Huntley-Brinkley Report, Mon.-Fri.-NBC-TV

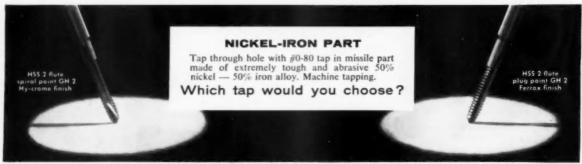


LUBRICATION IS A MAJOR FACTOR IN COST CONTROL

(PARTS, INVENTORY, PRODUCTION, DOWNTIME, MAINTENANCE)

Check your skill in tap selection with this

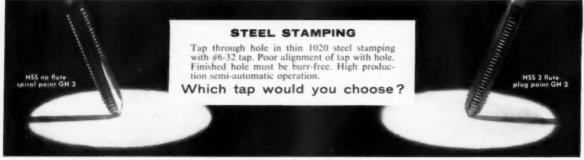
HY-PRO "TAP-nology" TEST



The HY-PRO #311 tap with Hy-crome finish (left) produced 5.7 times the number of holes per tap obtained with the 2 flute plug tap.



The HY-PRO #510-5 tap with Hardernell finish (right) produced 11.3 times the number of holes per tap obtained with the 2 flute spiral point tap.



The no flute spiral point tap. HY-PRO #315 with ferrox finish (left) produced up to 12.4 times as many holes per tap as the 3 flute plug point tap.

Call your local
HY-PRO DISTRIBUTOR
for standard taps
FROM STOCK



If you picked the wrong taps, don't be surprised. Most tap users make similar errors, without realizing it, when they buy taps by "habit," instead of by comparative performance.

These examples show *how much it pays you* to be right about taps. Selection today takes more tap knowledge than ever, with so many new metals, alloys, and plastics in industrial use.

To make sure your "tap-nology" is up to the minute, consult HY-PRO tap engineering specialists. It costs nothing, and records prove it is often the first step to big savings. Write: Dept. A.

HY-PRO TOOL COMPANY

DIVISION OF CONTINENTAL SCREW CO.

00000000000000000

NEW BEDFORD, MASS., U. S. A.





FOR ADDITIONAL INFORMATION please use reply card at back of Issue

CLEARING DIV., U. S. INDUSTRIES INC.

LATHE FEATURES WELDED STEEL CONSTRUCTION - The Clearing-Axelson "Blue-Chip" lathe offers 40 spindle speeds up to 2000 rpm. A 50 hp main motor delivers torque to the spindle for heavy cuts. Rough threading and heavy interrupted cuts are handled without perceptible vibration or "chatter."

The headstock is built to the floor and is a completely independent unit containing the drive and feed units, and the electrical equipment for the machine. It also serves to mount the operating console and other devices. The bed is mounted to the side of the headstock by a thick, extra wide flange, a unit which is as firm and rigid as any that can be practically designed. Both the bed and head stock are welded steel.

Standard gear shifting on the "Blue Chip" lathe is manual with a four position and a five position lever operating in two ranges taking care of all speed changes. However, power assisted and full power shifting are available as options.

Circle 66 on postcard for more data

DRILLMATION CO.

GUN-BORING MACHINE-The Boremation gun-drilling and gun-boring machine is capable of gun-drilling or gun-boring precise holes to specified tolerances in one pass from the solid. The operator can position, space and hold the workpiece for new drilling locations without removing the workpiece thereby maintaining precise hole alignment and relation-

Once the workpiece is clamped and held secure to the traversing table, subsequent operations like counter drilling, boring and chamfering can be performed in the one hole location; but, if the workpiece has a series of holes to be drilled in different locations, each new hole location can be located with the easily read and operated hand dials.

Circle 68 on postcard for more data

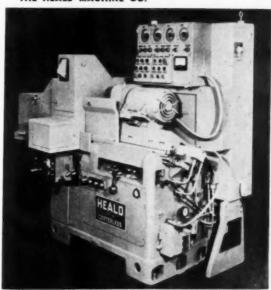
BARNES DRILL CO.

HONING MACHINE-A newly designed version of the Model 10 honing machine is being introduced for manual or automatic honing of bores from 1/4 to 11/2 in. in diameter. The control panel of the new model has been raised to a more readable position, the front of the cabinet is fully enclosed, and the head has received a new styling treatment.

The model is available with an airoperated six station rotary indexing fixture, and can be furnished with a variety of automatic equipment including magazine loading, automatic ejection, pre-gaging, post gaging, automatic shut-off and stone replacement, and sorting.

Circle 40 on postcard for more data

THE HEALD MACHINE CO.



cluded angle of taper on Size-Matic type is 60 degrees. Base on floor is 50 in. long and 30 in. wide, and the unit requires 80 by 80 in. of floor space. The table of this internal grinder is inclined at an angle of 30 degrees to the work. Circle 67 on postcard for more data

ROLL - TYPE CENTER-

LESS UNIT - Model

180A roll-type center-

less machine is designed for small to

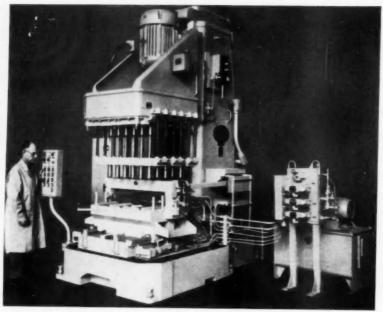
medium sized work that

can be rotated on its own OD. Work with 3/4

to 4½ in. OD can be handled, and holes up

to 3 in. long can be ground. Maximum in-

Machine Tools



Natco C4A drilling unit for machining fuel injector body holes in cylinder heads.

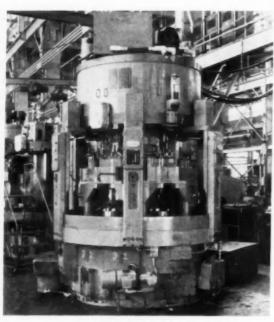
NATIONAL AUTOMATIC TOOL

MULTI-SPINDLE UNIT — Fuel injector body holes are machined in both 4- and 6-cylinder heads by this Natco multiple spindle driller. Three sets of spindles are provided so that three operations can be accomplished automatically.

Parts are loaded directly from a conveyor, located by two master dowel pins and hydraulically clamped in the fixture. When the master cycle button is pressed the machining operations take place automatically.

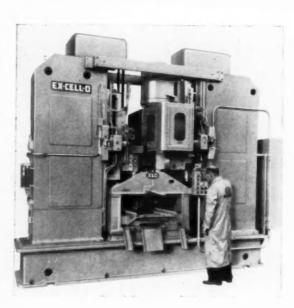
Finish in the seat angle at the bottom of the hole is held to 40 microinches. Hole location is held to ±0.0005 in. and hole spacing to ±0.001 in. Natco's C4A vertical Holesteel drilling machine has a 28 by 36 in. cluster box head with 18 helical gear-driven spindles. The power unit is separate in accordance with JIC standards.

Circle 69 on postcard for more data



THE BULLARD CO.

CENTER TURNING LATHE—Especially developed for the production of steering knuckles and many types of shafts where no deflection is permissible is this Mult-Au-Matic machine. It is available with either six or eight spindles and is designed for large volume production of many types of pieces—such as steering knuckles, transmission shafts, rear-oxle shafts, cam shafts, Pitman shafts, and crankshafts for small engines. Pieces up to 18 in. between centers can be accommodated.



EX-CELL-O CORP.

VERTICAL BORING MACHINES—Two custom vertical precision boring machines have been designed which are capable of rough and finish boring and chamtering as many as nine holes ranging in size from 1/6 in. diameter to 51/6 in. diameter in one pass. The machine base and standard columns are of heavy construction. Standard, hydraulically operated vertical slides carry standard boring spindles, mounted in clusters. The design permits ease of maintenance and provides flexibility for changes in product design.

Circle 71 on postcard for more data

LAPOINTE MACHINE TOOL CO.

BROACHING MACHINE—The "Eager Beaver" small pull down Lapointe broaching machine is midget size rated 1½ ton at 5 fpm broaching

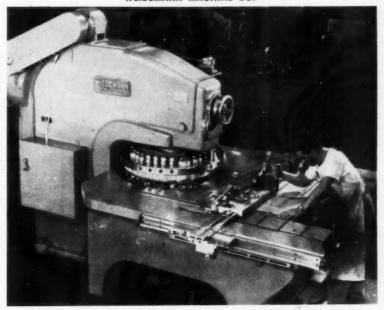


Lapointe broaching machine

speed, and ¼ ton at 10 fpm. Built with a 12 in. stroke, its standard equipment comprises two cutting speeds and mechanism for adjusting the stroke.

Circle 72 on postcard for more data

WEIDEMANN MACHINE CO.



TURRET PUNCH PRESS—Featuring a 33 in. throat depth, large metal sheets can be completely pierced with this 40 ton capacity RA-61 Turret Punch Press, which is equipped with a high-speed follower gage.

Circle 74 on postcard for more data

NORTON CO.

LAPPING MACHINE—This crankshaft lapping machine produces fine surface finishes by means of coated abrasive strips.

The No. 31 Crank-O-Lap machine is designed for low-cost production of fine surfaces on external diameters of automotive type crankshafts. It laps pins and bearings simultaneously in an automatic cycle to low micro-inch readings for improvement of crankshaft service life.

Although developed to finish crankshafts, the machine is also suited to improving the finish of other types of parts.

Circle 73 on postcard for more data

Norton No. 31 Crank-O-Lap crankshaft lapping machine. Machine actions occur through the use of a few hydraulic mechanisms, all of which are on the outside of the machine where they offer instant accessibility. Timing-belt drive provides a smooth, positive work rotation which benefits lapping.



BROWN & SHARPE MFG. CO.

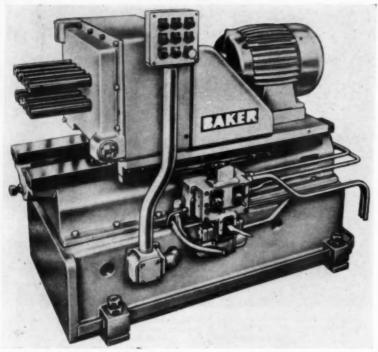
SURFACE GRINDING UNIT — The 618 Micromaster is designed for rapid production of highly accurate surface grinding of small and medium sized work and is available in three basic models.

Unit construction permits all machines to be assembled to individual requirements—there are over one hundred combinations of spindles, spindle drives, locations of handwheels, etc. The machine grinds work to 6 in. wide and 18 in. long. Using a full size 8 in. wheel with the vertical

adjustment handwheel located on the bed, work to 14 in. high can be handled; with the handwheel on the upright, the maximum work height is 12 in. Extra vertical capacity parts increase these capacities to 18 and 16 in. respectively.

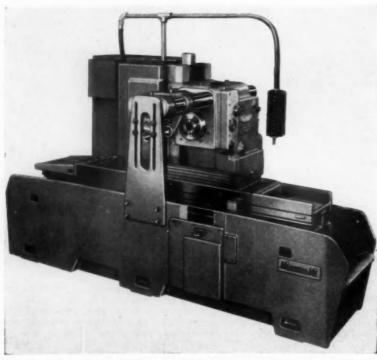
Circle 75 on postcard for more data

BAKER BROTHERS, INC.



HORIZONTAL MILLING MACHINE—Shown is a horizontal milling machine. It is designed to accommodate any of approximately 27 fixed center heads. All electrical and hydraulic controls are located on the outside of the unit.

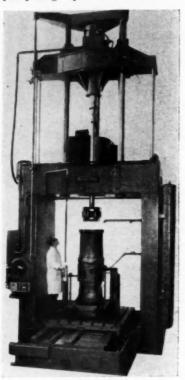
Circle 76 on postcard for more data



Mil-waukee-Mil designed by Kearney & Trecker for automatic production milling

BARNES DRILL CO.

HEAVY DUTY HONING UNIT— This heavy duty machine is designed for honing large bearings, cylinders, cylinder liners, Diesel parts, compressor cylinders, etc. It provides a capacity range up to 36 in. in diameter



Barnes honing unit

and 72 in. in length and is equipped with a 30 hp motor on the head. There is a 20 hp motor on the hydraulic units. It is also equipped with pneumatic hone expansion and an 80 in. stroke.

Circle 77 on postcard for more data

KEARNEY & TRECKER CORP.

BED TYPE MILLING MACHINE—The Mil-waukee-Mil is a bed type milling machine which provides automatic production milling by dialing the results directly from the blueprint ahead of time. The operator merely dial-programs machine functions on the Dial-a-Cycle control panel, by means of phase-switch dials, which control each machine function automatically.

Any number of functions can be phased into a cycle, including automatic quill retraction, rise and fall to the head, and tracer control.

Circle 78 on postcard for more data

NEBEL MACHINE TOOL CORP.

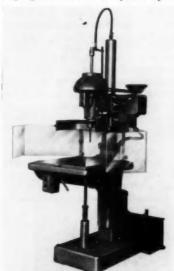
BED GAP LATHE—The HXB 26/45 in. heavy duty lathe offers precision machining capabilities for turning and facing a wide variety of heavy duty work. The double-purpose Nebel extension bed gap lathe can operate as an engine lathe with 26½ in. swing over the bedways, or as a gap lathe for large, odd-shaped parts, with 46 in. swing through the gap. A 75 per cent increase in distance between centers is available by opening the gap, the distance being 48 in. with gap closed, 84 in. with gap open.

The three-bearing spindle is mounted at the front and center supports on zero precision, angular tapered roller type bearings, preloaded and adjusted for maximum radial and thrust loads. At the rear, the third bearing, radial type, provides for longitudinal spindle expansion. The spindle itself is an alloy steel forging, completely ground, with hardened nose. Easily controlled by two levers and color keyed speed plates, 18 gear driven speeds may be simply selected from a direct reading color index.

Circle 84 on postcard for more data

BUFFALO FORGE CO.

DRILLING MACHINE — This hollow spindle drilling unit is made for use with "cold point" and "Diamond Impregnated Bits" at speeds up to



Buffalo hollow spindle drilling machine

10,000 rpm. It has an accurately balanced hollow spindle, coolant system having a pump with a capacity to 100 psi to cool and flush away chips, special splash guards, and a rubberflex collet chuck.

Circle 85 on postcard for more data

THE U. S. BURKE MACHINE TOOL DIV.

U. S. BURKE vertical toolroom milling machine's V-belt drive transmits full power of the ¾ hp motor at all six spindle speeds from 250 to 3450 rpm or alternately 185 to 2550 rpm. All controls are located for maximum operator efficiency and convenience. Dials are 3½ in. satin finished chrome. All bearing surfaces are precision ground or hand scraped.



VERTICAL TOOLROOM MILLING MACHINE—Built accurately and ruggedly to accepted machine tool tolerances, this vertical toolroom milling machine, named the Millrite, is designed for precision milling and horing operations.

Equipped with a swivel head, the Millrite is capable of angular, as well as vertical operations. The ram and turret machine has a 7 by 27 in. table with longitudinal feed of 12 in. Quill travel is 4 in. Maximum distance from the spindle nose to the face of the

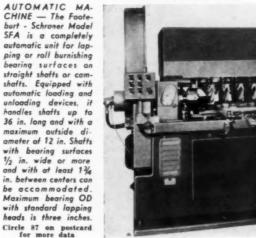
column is 16 in. and maximum distance from the nose to the top of the table is 18 in.

The unit has a hard, chrome plated quill 3½ in. in diameter. The column is one-piece ribbed, close grain cast iron, and the overarm is internally ribbed with a full 7½ in. diameter flange to which the head is attached.

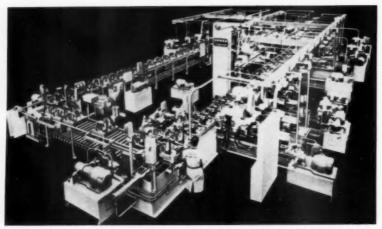
A feature of the unit is the "Feather Feed" of the quill, using the inherent accuracy and smoothness of a lead screw and nut arrangement.

Circle 86 on postcard for more data

THE FOOTE-BURT CO.



Machine Tools



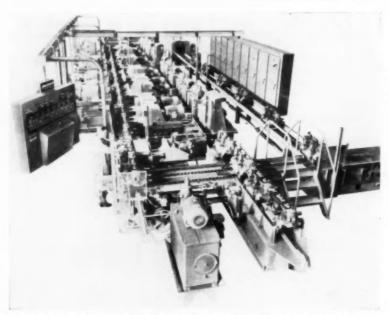
Cross Transfer-Matic performs 66 operations on steering gear housings

THE CROSS CO.

SECTIONALIZED TRANSFER-MATIC—Most of the machining and inspection operations on a hydraulic steering gear housing have been combined in a sectionized, pallet-type transfer-matic.

Sixty-six operations are performed on each part as it passes through the 55 machine stations. Rated capacity of the machine is 200 pieces per hour when operating at 100 per cent.

Circle 79 on postcard for more data



Buhr 26-station Economatic holds close tolerances while producing parts in 24-seconds

BUHR MACHINE TOOL CO.

TRANSFER MACHINE—Not all of the 115 operations done by this 26 station Economatic can be listed as "precision machining" but some tool diameters and some product dimensions including the flatness of a recessed step are held to dimensions specified in tenths of a thousandth. Smoothness, in some cases, is held to 70 microinches rms.

To facilitate tool and fixture maintenance, three tool control boards have been located strategically within the machine. These boards have built-in gages so that all tools can be preset. Interruptions of production for tool changes are kept to a minimum.

Circle 80 on postcard for more data

THE INGERSOLL MILLING MACHINE CO.

AUTOMATIC CUTTER GRINDER—An automatic cutter grinder will do a complete sharpening job on a wide range of milling cutters since it will grind on the OD as well as face and bevel any cutter within its 4 to 20 in. diameter capacity. It spingrinds newly filled cutters to size. As the grinding wheel wears, the spindle speed automatically increases so that constant surface speed is maintained. The wheel is automatically dressed with every stroke.

Circle 81 on postcard for more data

F. JOS. LAMB CO.

MILLING MACHINE—Transfer machine design features applied to a special piston weight boss milling machine provide a production rate of 425 pistons per hour. The machine loads, orients, clamps, mills, clears chips and unloads in a completely automatic cycle. Two size pistons can be accommodated with interchangeable tooling. A trap type rotary transfer mechanism prevents station override on the unit. JIC standards are met on all hydraulic and electric components.

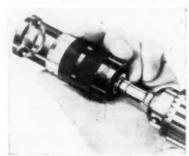
Circle 82 on postcard for more data

SCHRILLO AERO TOOL ENG. CO.

COUNTERSINK TOOL—The Schrillo fully-adjustable Micrometerstop countersink is a fast-cutting, light-weight hand tool used to deburr, produce internal chamfers or countersink to precise depths. It may also be used on lathes or drill presses.

It features a hardened and cylindrically ground steel alloy shaft operating within an extra long self-lubricating bearing. Rapid adjustment for depth of cut is made by merely retracting and rotating the spring-loaded thimble to any desired position. Precise machine-cut serrations provide positive locking. Final cut is accurate within \pm 0.001 in.

Circle 83 on postcard for more data



Schrillo countersink tool

News of the MACHINERY INDUSTRIES

- By Charles A. Weinert -

NMTBA Transfers Headquarters from Cleveland to Washington, D. C. Cincinnati Milling Machine Brings Out Elektrojet Line of 33 Electrical-Discharge Machines

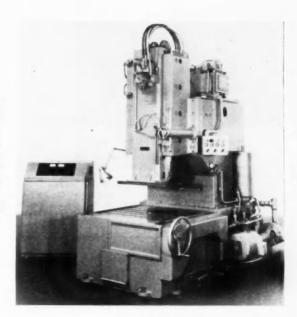
NMTBA Relocates In Washington

Headquarters of the National Machine Tool Builders' Association, as of September 1, have been moved from Cleveland to 2139 Wisconsin Ave., Washington, D. C.

The 7500 sq ft of office space occupied by the Association in the newly-constructed three-story building was laid out to meet its specific needs.

Ludlow King, NMTBA executive vice-president, in announcing the move last month, said "Most of the Association's key personnel are moving to Washington" and "The move will cause no break in Association activities."

The large Cincinnati Milling Machine Company's Elektrojet die-sinking machine is equipped with a ram-type workhead and a disappearing tank for holding the dielectric, and was designed particularly for heavyduty die work on block up to 18-in.



Cincinnati Milling Unveils Spark Machines

The Cincinnati Milling Machine Co. has introduced a completely new line of electrical-discharge machines, totaling 33 combinations in all, called Elektrojet. Utilizing the "building-block" principle, they are built up mostly from 16 units comprising 2 bases, 2 slides, 4 workheads, 4 base-tank units, and 4 power supplies. Many of these "building blocks" are completely interchangeable.

The basic Elektrojet line consists of a single base and column on which may be mounted four interchangeable workheads and four different base-tank units. Workhead choices are: non-rotating, rotating, universal (provides eccentric or planetary rotation to the spindle, in addition to quill feed and electrode rotation), and ram type (for extra large plunging cuts).

Tank options for holding the di-

electric are: solid tank, openfront tank, disappearing (in the bed) tank, and moving-table tank.

Fixed and adjustable workhead slides are also offered, as well as a choice of 20, 40, 60, and 100-amp power supplies.

The line is rounded out by two electrical-discharge grinding machines, and a heavy-duty die-sinking machine. The die-sinker is built with a larger base and column than the basic line. It has a ram-type workhead and a disappearing tank; and was designed mainly for heavy-duty die work on blocks up to 18-in. thick.

Cincinnati's method employs a gap between the electrode and workpiece of 0.001 in. and spark frequencies ranging from 10,000 to 250,000 times per sec. The workpiece and electrode are bathed in a dielectric fluid (at 10 psi flow pressure through the gap) which

assists in controlling the spark and washes away the debris ejected from the craters.

In addition to die-sinking, the process is adaptable to tool sharpening, surfacing, forming, and piercing, among others, including close-tolerance fine-finish part production and machining of otherwise unmachinable metals. At the upper limit, cavities of 50 cu in. have been machined at metal removal rates of as much as 0.016 to 0.018 cim.

G&L Manufacturing Set Up in Scotland

Giddings & Lewis Machine Tool Co. has established manufacturing operations in Scotland by joining Douglas Fraser & Sons, Ltd., of Arbroath, Scotland, in the formation of a new British company. G&L owns the controlling



Numerically-Controlled Machine Mills Cam Contours

The custom Ex-Cell-O Numera-Trol cam milling machine pictured was designed for milling three-D contours on fuel metering drum cams and other complex cam configurations. To set the machine in operation, the punched tape is placed into position in the centrol cabinet and a cam blank loaded in the machine. After adjusting the machine to zero position, the cutting of the cam is entirely automatic, the machining instructions being supplied by the tape. In the insert is shown a typical cam produced by this machine.

interest of the company named Giddings & Lewis-Fraser, Ltd.

The new combine has acquired the manufacturing facilities of Douglas Fraser & Sons, Ltd., known as the Engineering Division. It will continue to make and market Fraser-designed automatic hydraulic milling and centering machines, production milling machines, and multi-spindle drilling machines, as well as a line of milling, drilling, and centering heads marketed under the trade name of Endomatic. In addition, the new company will manufacture G&L 3, 4 and 5-in.-diamspindle table-type horizontal boring, drilling, and milling machines for foreign markets.

The modern plant at Arbroath is self-contained with a fully-staffed engineering department, Meehanite foundry, pattern-making department, machine shops and toolroom, heat treating, forging and metal fabricating departments. It consists of nearly 300,000 sq ft of floor space and employs more than 700 people.

Ralph J. Kraut, president of G&L, said the new company had been formed in order to enable Giddings & Lewis to compete more favorably in the sale of its products in world markets.

Improved Die Blocks and Forgings

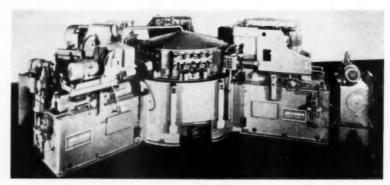
A. Finkl & Sons Co., of Chicago, Ill., recently demonstrated its new vacuum degassing process for producing cleaner and tougher steel for use in the die blocks and forgings the company makes. The new method removes hydrogen gas, a cause of microscopic cracks, from molten steel in the ladle.

At the start of the degassing process, a 75,000-lb batch of molten nickel alloy steel is poured from the electric furnace into a ladle at around 3000 F. The ladle is then placed inside a large vacuum degassing chamber, and the cover put in place.

Four steam ejector suction pumps, turned on in proper sequence by automatic controls, draw out the air and create a high vacuum inside the chamber. This causes the hydrogen in the steel to bubble to the top and to be drawn out of the chamber. Oxygen and nitrogen likewise bubble up and out.

In addition, helium is injected into the steel in the ladle, and serves to increase the turbulence and vacuum removal of unwanted gases. The whole cycle takes about 12 minutes.

(Turn to page 152, please)



Five-Way Dial-Index Special Machines Connecting Rods

Developed by Buhr Machine Tool Co., this special five-way dial-index machine drills, core drills, reams and chamfers the piston pin holes of forged track connecting rods. It also bores the crankpin hole, with two cuts displaced vertically to allow for metal removed when parts are severed; and then separates the cap from the rod with a slitting saw. The machine was designed for use with either HSS or carbide tools. With four sets of connecting rods and caps completed in each 36-sec cycle, production rate of this unit is 300 sets per hour at 75 per cent efficiency.



He likes the roar of a high-speed engine. It gives him a sense of power. When he takes off down the highway, he slips into another world. He's different—a man of distinction—accustomed to the better things in life.

And when he shifts through all those gears, he expects each one to mesh perfectly. The bearings he takes for granted, as long as they keep rolling. He may not know who makes the superb alloy steels that go into gears and bearings, but the best ones are known as USS CARILLOY Steels.

Every automobile enthusiast appreciates a fine piece

of machinery. And when the vital parts are made of USS CARILLOY Steels, you're giving him something to talk about. These steels are tough and strong. They can take the shock of fast starts and they don't wear out in a hurry.

Give the boys a break. Use gears and bearings made of USS CARILLOY Steels. And if you need a service metallurgist, just call the nearest U. S. Steel sales office. For more information on USS CARILLOY Steels, write United States Steel, 525 William Penn Place, Pittsburgh 30, Pa.

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United States Steel



AUTOMATIC CONTROLS

PRODUCTION-VEHICLES-AIRCRAFT

By Samuel Cummings

TUNNEL DIODE

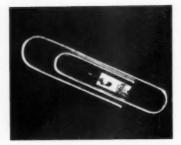
A promising new device, called a "tunnel diode," could lead to important advances in the field of electronics, according to General Electric Co.

Developed by GE scientists, the tunnel diode is related to the transistor, but operates on an entirely different principle. Both devices are made of the same materials and both do the same work as vacuum tubes: They act as amplifiers to make big signals out of little ones; as rectifiers, to change alternating to direct current; and as switches, to turn electric current on or off or to direct its flow.

But General Electric scientists claim the tunnel diode has important advantages over the transistor in size, speed, ruggedness, power requirements, and simplicity.

The future of the tunnel diode is considered especially promising in the fast-growing computer field, GE scientists say, because of its extremely small size and its high-speed response. It is relatively unaffected by environmental conditions, and is claimed to be 1000 times better at resisting nuclear radiation effects than is a transistor.

The tunnel diode takes its name from a physical phenomenon known as "quantum-mechanical tunneling," which is responsible for its operation. Electrical charges move through the device at the speed of light, making it possible to operate



Tunnel diode built by General Electric is so small it fits inside a paper clip, with room to spare. Connecting wire (left end) leads into an alloy, which is soldered to a aermanium crystal (dark area). The crystal, in turn, is soldered to a rectangular metal plate, which forms the other connection.

it at extremely high frequencies. Oscillation frequencies higher than 2000 mc have been obtained and frequencies of more than 10,000 mc are expected in the near future.

The tunnel diode consists of a wire leading to an alloy, which is soldered to a germanium crystal. Attached to the crystal is a rectangular plate which forms the other connection. The complete unit is so tiny that it could fit inside a paper clip (see illustration).

One of the device's unique characteristics, GE scientists point out, is its negative resistance over part of its operating voltage range. An electron subjected to the tunneling effect, they explain, can disappear from one side of a potential barrier and instantly appear on the other side, even though it does not have enough energy to surmount the barrier.

In the case of the tunnel diode, the barrier is the space charge depletion region of a p-n junction. This is the same barrier that prevents current from flowing in the reverse direction in an ordinary rectifier diode.

In the tunnel diode, this barrier is made so thin—less than a millionth of an inch—that penetration by the tunnel effect become possible. This gives rise to an additional current in the diode at the very small forward bias, which disappears when the bias is increased. It is this additional current that produces the negative resistance in a tunnel diode.

In the field of communication, GE says, tunnel diodes will compete with transistors, parametric amplifiers, vacuum triodes, magnetrons, klystrons, traveling wave tubes, and masers.

For computer applications, the tunnel diode's advantages are that it is at least 100 times faster than transistors and uses only about one-hundredth as much power. In addition it is far less sensitive to temperature changes, which may allow circuits to be simplified without losing stability.

Although the device is still in the laboratory stage, experimental samples will be offered on a limited basis sometime in September or October by GE's Semiconductor Products Dept.

MACHINE TRANSLATION

Experiments in machine translation are beginning to pay off.

A new program developed by the National Bureau of Standards now makes it possible to put together the English equivalents of Russian words in such a way as to convey the gist of the source material "intelligibly and faithfully."

With some improvements and shortcuts in the programming, what NBS calls a "practical" machine translation may cost no more than the services of a human translator.

Theoretically, according to NBS, the problem of translating from one language to another is not completely solvable. A sentence does

PRODUCTION DOLLARS WORK HARDER FOR YOU WITH IBM DATA PROCESSING

Exceeding estimates? What do materials cost? What is the labor utilization? What are the causes of excessive indirect costs? How do current costs compare with standards and budgets?

With IBM cost-control methods you get up-to-date answers to help you spot runaway costs in time for action. And IBM flexibility provides cost analyses by job number, cost center, department, part number and operation.

As a direct by-product of cost controls you get mechanized related records . . . summary payroll card, checks and earnings statements, labor distribution, direct and indirect labor costs.

COMPLETE MANUFACTURING MANAGEMENT

In every area of manufacturing, IBM data processing systems are supplying information once impractical to obtain . . . closing the time lag between data and management decision.

For more information on IBM manufacturing management methods, call your local IBM representative today. IBM data processing equipment may be purchased or leased.

COST

IBM DATA PROCESSING

Circle 187 on Inquiry Card for more data

not always express a thought. Furthermore, a thought may not have been well stated The human translator's task is to render such distorted sentences in such a way as to convey the intent of the original material. Such a task becomes quite formidable where a machine is involved, especially since present-day computers don't have the capacity for rapid economical translation.

The NBS technique consists of two parts. The first part merely "looks up" every source word in a Russian-English glossary, which is stored in greatly condensed form on magentic tape. Prefixes and suffixes are stored separately from the glossary.

The information from part 1 is used in part 2 of the scheme to put individual words together into a meaningful, if not esthetic sentence.

The crux of the system lies in the fact that most words of a language tend to associate with certain other words. These tendencies are listed in the glossary and predictions are made—on the basis of these tendencies—concerning word associations that are to be expected.

The translation scheme progresses by linking together words which seem to fit each other and by recording the doubts, conflicts, and indecisions that may arise. By this method of predicting and then checking results, so-called target words are gradually modified and rearranged, in the manner of jigsaw pieces, to complete the puzzle.

It is not at all certain, says NBS,

TRANSISTORIZED VACUUM TUBE



Transistorized vacuum tubes may result from a recent Westinghouse discovery that silicon carbide can replace the heated filaments in conventional tubes. Westinghouse research scientists report that a tiny silicon carbide crystal emits electrons when voltage is applied across a built-in junction. This development may result in a "solid state" electronic tube that combines many of the advantages of semiconductors and vacuum tubes. The silicon carbide crystal is inside the cartridge being inserted into the experimental tube shown above.

that the final translation is an accurate one. But since the English language is far less sensitive to syntactical and grammatical variations than is the Russian, in the majority of cases the English translation should be meaningful and faithful. If not, it should furnish clues as to how the translation scheme might be further improved, NBS says.

INSTRUMENT SALES RISE

U. S. exports of precision instruments in 1958 hit a new high of about \$231 million compared with the previous peak of \$217 million in 1957, according to the U. S. Dept. of Commerce.

The industrial group—indicating, measuring, and control instruments—accounted for 80 per cent of the total, or \$185 million. In this category, sales of mechanical measuring instruments totaled

114 million; sales in the scientific and engineering instruments group accounted for the balance of \$56 million.

Sales were scattered through more than 130 countries, the Commerce Dept. said. The ten largest markets (in millions) were: Canada \$66; Venezuela \$17; Mexico \$10; Brazil \$8; Cuba \$4; Japan \$17; France \$10; Germany \$9; Italy \$9; and United Kingdom \$7.

METALS

(Continued from page 129)

Price Increase Foreseen

The London market for zinc continues to advance to about 101/2 cents per pound. This would require about 121/2 cents delivered in New York to make export profitable, after paying tariff, freight. and insurance charges. Hence, it is common belief in the trade that a higher price than the present 11 cent East St. Louis level, or 111/2 cent delivered, can be expected in the near future. A price increase to 12 cents a pound would probably have been established a month ago if it had not been for the work stoppage in steel, and an end to the strike would probably be signalled by a quick advance in zinc. The American Smelting & Refining Co. is quoted as saying that the prospect of a higher zinc price appears reasonably good, and this big factor in the metal trade has been noted for its conservatism.



PLANT AIR

Moisture Chief Cause of Trouble . . .

Every company today is looking for ways to offset the increased costs of labor, material, equipment and services. At a gasoline station you expect "Free Air", but in industry it is a major expense. Perhaps in your own plant, for an investment in a few minor compressed air system alterations, significant savings are possible.

Water, sludge, rust, oil and dirt in com-pressed air systems are prime causes of maintenance and production down-time. Water vapor condensing in air lines tends to corrode the piping. Also, water present in the piping may freeze during winter, causing serious reduction of compressed air supply. Such restrictions are often difficult to locate and thaw. This same line moisture may emulsify lube oil destroying its lubricating value and the resultant mixture has high fouling characteristics. Frequently, ice will form within the tool itself since expanding air cools the moisture . . . tool efficiency will be seriously affected.

Some of the Other Problems Created By Wet Compressed Air..

Wet compressed air is not only a construction and production tool problem. Faulty paint jobs, contaminated chemical and food products can often be traced to moisture laden compressed air. Water-hammer, unequal pipeline thermal expansion and line leaks also result from collected moisture. In addition, air lost through traps, and in blow-down of com-pressed air lines provide no useful work . . represent a sizeable power loss.

You Can Lick Compressed Air Moisture Problem . . .

All of these hidden costs can be virtually eliminated by the installation of an Adams Aftercooler and Cyclone Separator between the compressor and receiver tank. By cooling discharge air to within 10° F. of cooling water temperature guaranteed with Adams standard Aftercoolers - the moisture can be removed at the separator. Pressure loss is less than one-half pound on these units including the separator. In severe cases, moisture removal of over 90 per cent can be obtained by cooling the air with Adams 2° Aftercooler to within 2° F. of water temperature.

Air Filter for Final Protection at Point of Use ...

As an added safeguard for expensive tools and equipment, an Adams Poro-Stone Air Filter should be installed just before the air is used. These filters remove all solid material picked up by the air stream. With an Adams Aftercooler, Cyclone Separator and Air Filters clean, dry, trouble-free air is supplied to your production tools. You get continuous service with minimum maintenance.

For further information on how the complete line of Adams air equipment can solve your compressed air problems, write today for your free copy of Bulletin No. 712 on Aftercoolers and Bulletin No. 117 on Poro-Stone Air Filters from the R. P. Adams Company, Inc., 264 East Park Drive, Buffalo 17, New York,

Circle 169 on Inquiry Card for more data

News of the **MACHINERY INDUSTRIES**

(Continued from page 146)

During the degassing cycle the steel loses very little temperature, and after processing can be poured directly into one or more ingot molds at about 2850 F. The company also found that degassed steel can be poured at about 30 deg lower temperature than nondegassed steel.

Company tests show that the amount of hydrogen content dropped from an average of 3.9 parts per million down to 1.5 parts per million, indicating that 60 per cent of the prior hydrogen content had been removed. About 80 per cent of the company's special-purpose steels is now being vacuum-degassed.

Around the Industry

American Machine Tool Distributors' Assn .- has moved its headquarters' offices to 1500 Massachusetts Ave., N. W., Washington 5. D. C.

E. G. Staude Mfg. Co., Inc .machinery building operations of this Ex-Cell-O subsidiary are being moved from St. Paul, Minn., to the parent company's plant at Bluffton, Ohio.

Motch & Merryweather Machinery Co. - has purchased Modern Tool Corp. and Radial Cutter Mfg. Corp. of Elizabeth, N. J., manufacturers of carbide-tipped circular saw blades. Plant facilities will be moved to Cleveland, Ohio, and made part of the company's Cutting Tool Mfg. Div.

Cross Co .- A. A. Vetter has been named manager of overseas operations. He left for Europe last month to begin operations for the new Cross plant in Germany

Buhr Machine Tool Co.—Chester S. Johns has been elevated to the position of general sales manager.

Pratt & Whitney Co., Inc. -James H. W. Conklin has been made general sales manager and assumed the new post on August 17. He will direct all domestic sales and marketing activities for the company's line of machine tools, cutting tools, and gaging equipment.

В



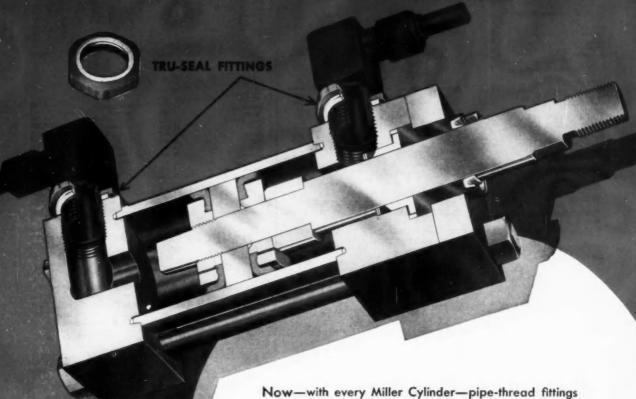
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END NIGHT CLEANUP & MORNING REBLUING
OYKEM HI-SPOT BULE No. 107 is used to locate high spots
when scrapping bearing surfaces. As it does not dry,
it remains in condition on work indefinitely, saving
scraper's time. Intensely blue, smooth paste
spreads thin, transfers clearly. No grit; noninjurious to metal. Uniform. Available in collapsible
tubes of three sizes. Order from your supplier.
Write for free sample tube on company letterhead.
Write for free sample tube on company letterhead.
OYKEM CO., 2301-L. N. 11TH ST., ST. LOUIS 6, MO.
Circle 175 on Inquiry Coeff for more data.

Circle 176 on Inquiry Card for more data

NOW...even the PORTS have seals of the PRESSURE SEALING TYPE!

(J.J.C. Standard H6.2.2)



Specify

Miller

For

Greater Reliability

Now—with every Miller Cylinder—pipe-thread fittings (Tru-Seal) of the pressure sealing type are provided at no extra cost for sealing the cylinder ports.

Additional advantages of these fittings are:

- All circuit piping and fittings can be easily positioned.
- Damage to equipment caused by high tightening torque is completely eliminated (especially on valves, pumps, etc.)
- 3. Sealing material is Teflon, which is compatible with all hydraulic fluids (J. I. C. Standard H6.2.1)



Engineering Bulletins on Miller Air and Hydraulic Cylinders Available on Request MILLER FLUID POWER

DIVISION OF FLICK-REEDY CORPORATION

7NO24 York Road, Bensenville, Illinois

AIR AND HYPRAULIC CYLINDERS - ACCUMULATORS
COUNTERSALANCE CYLINDERS - BOOSTERS

· · INDUSTRY STATISTICS · ·

WEEKLY U.S. MOTOR VEHICLE PRODUCTION

As reported by the Automobile Manufacturers Association

	Week	es Ending	Year to Date				
Make	Aug. 15	Aug. 8	1959	1959			
PASSENGE	R CAR	PRODUCTION					
Total American Motors	0	8,217	267,758	110.834			
Chrysler De Soto Dedge Imperial Plymouth	0 0 0 11 6	0 0 0 0 754	50,265 33,965 108,946 11,930 307,005	38,508 23,050 67,195 8,213 254,084			
Total - Chrysler Corp	17	754	512,111	388,050			
Edsol Ford Lincoln Morcury	493 33,448 362 3,264	414 35,687 399 3,246	26,177 1,041,546 18,508 101,564	8,278 625,830 16,514 80,250			
Total Ford Motor Co	37,567	39,740	1,187,795	730,872			
Buick Cadillac Chevrolet Oldamobile Pentiac	0 0 30,464 2,340 2,144	2,880 2,713 38,631 8,732 8,799	161,076 106,281 1,116,961 275,216 300,172	133,111 89,510 885,547 203,146 136,703			
Total - General Motors Corp.	34,968	59,525	1,959,706	1,448,017			
Total Studebaker-Packard Corp.		12	98,052	23,609*			
Checker Cab	0	0	2,839	2,120			
Total—Passenger Cars	72,552	108,248	4,028,261	2,703,502			

TRUCK AND BUS PRODUCTION

Chevrolet	343	573	251,407	183,301
G. M. C.	1,753	1.729	60,586	38,867
Diamond T	85	71	3.902	3.312
Divce	80	80	2.292	1,728
Dedge and Fargo	1.191	1.002	50,655	38.325
Ford	6.204	6.368	222 343	142.041
F. W. D. Corp.	21	13	650	812
International	342	329	92.162	58.326
Mack	380	376	11.042	9.463
Studebaker	376	150	8 816	6 271
White	442	430	12,423	10 424
MAINE	0		72.074	40 963
Other Trucks	65	70	2.393	1.063
Other tracks		140	2,303	1,003
Total-Trucks	11,282	11,200	790,744	544,796
Russe			1 016	0 122
Buses	9	9	1,615	2,133
Total - Motor Vehicles	83,839	119,453	4,820,620	3,250,431

NEW FOREIGN CAR REGISTRATIONS

JUNE

1959		1958	
Volkowagen Renault English Ford Opel Flat Simca Hillman Triumph Yauxhall Volvo All Others	11,987 8,143 3,799 3,624 3,527 3,028 2,816 2,282 1,988 1,779 14,258	Velk swagen Renault English Ford Flat M. G. Triumph Hillman Vauxhall Sinca Volve All Others	6,422 3,436 2,817 1,919 1,773 1,650 1,511 1,437 1,336 1,219 7,838
Total	87,211	Total	31,357

First Six Months

1959		1958	
Volkowagen Renault English Ford Opel Simon Fiat Hillman Triumph Vauxhall Volvo	54, 313 38, 436 22, 066 19, 384 18, 650 18, 405 14, 541 11, 366 10, 971 9, 586	Volkswagen Renault English Ford Hillman Fiat M. G. Sinca Triumph Vauxhall Opel	40,400 17,682 13,708 7,868 7,806 7,609 7,172 7,052 6,278 5,827
All Others	71,753	All Others	38,289
Total	289,443	Total	159,688

RETAIL CAR SALES BY PRICE GROUPS*

May, 1959

Price Group	Units†	% of Total	Dollars 9	% of Total
Under \$2,000	153,517	29.07	\$355,517,549	24.21
\$2,501 to \$3,000	284,845	53.93	767,730,415	52.26
\$3,001 to \$3,500	41,710	7.90	133,651,483	9.10
\$3,500 to \$4,500	30,895	5.85	117,729,362	8.02
Over \$4,500	17,167	3.25	94,108,097	6.41
Total	528,134	100.00	\$1,468,736,906	100.00

^{*—}Calculated on basis of new car registrations, as reported by R. L. Polk & Co., in conjunction with advertised delivered price at factory of four door sedan or equivalent model. Does not include transportation charges or extra equipment.

1959 NEW REGISTRATIONS

Arranged in Descending Order According to the Six Months 1959 Totals

NEW CARS

	fune			Six	Months
Make	June 1959	May 1959	June 1958	1959	1958
Chevrolet	145,797	141.062	121,000	755,628	659,477
Ford	140,200	137,006	87,177	733,946	500,552
Pontiac	37,570	39,110	19,361	200,938	122,358
Plymouth	40,434	41,422	34,255	195,209	201.803
Oldsmobile	34,550	35,606	26,678	194,671	168,083
Rambier	36,390	35,852	17,256	176,604	78,520
Buick	21,297	23,628	20,662	134,752	141,534
Mercury	13,298	13,940	12,100	76,891	70,871
Cadillac	11,863	13,137	10,753	75.787	68.045
Dodge	15,412	15,090	10.926	72.587	68,725
Studebaker	12,154	12,588	3,656	68,421	20.942
Chrysler	6,463	6.481	4,886	31,918	32,437
Edsel	3.774	4.208	3,254	24,220	22,003
De Sete	4.319	4,495	3,886	23,000	26,511
Lincoln	2,005	2,534	1.938	15.030	15,468
Imperial	1,488	1.665	1,125	9.067	8,441
Misc. Demestic	492	469	416	2,769	3,222
Foreign	87,211	53,963	31,278	289,443	159,367
Total All Makes	584 816	882 266	410 607	3 090 981	2 368 359

Source: Based on data from R. L. Polk & Co. All rights reserved. Re-use prohibited.

NEW TRUCKS

				Six Months				
Make	June 1959	May 1959	June 1958	1959	1958			
Chevrolet	30,779	30,905	23,646	167,552	122,544			
Ford	25,893	25,379	19,327	136,931	98,559			
International	9,900	9,940	6,753	49,247	43,139			
G. M. C.	5,908	6,479	4,392	35,135	25,554			
Dodge	5.049	4,406	3,123	27,590	18,896			
Willys Truck	1,448	1,473	962	8,550	6,220			
White	1,473	1,485	873	7,731	5,928			
Mack	1,270	1,249	970	7,120	5,610			
Willys Jeep	837	708	497	4,227	2,800			
Studebaker	553	555	353	3,175	2,252			
Diamond T	235	295	225	1,274	1,400			
Brockway	101	106	69	553	396			
All Others	3,459	3,676	2,785	20,256	14,291			
Total—All Makes	86,914	86,566	63,995	409.341	347,509			

* Includes Packard.

Solve Your Adjustable Speed Problems



Combination

AJUSTO-SPED

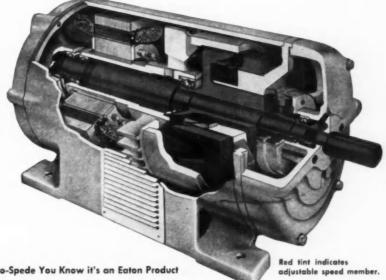
f your problem is in the field of speed control, tension control, power transmission, or testing, Dynamatic Eddy-Current Equipment is the ideal solution. Dynamatic Ajusto-Spede Drives, Couplings, Brakes, and Dynamometers are solving these problems in virtually every industry-in both plant machinery and end product applications. Dynamatic equipment can do the same for you.

Ajusto-Spede Drives and other Dynamatic units offer the important advantages of rapid response, wide speed range, quiet operation, low power loss, low maintenance costs, and stepless adjustable speeds from an AC power source.

For complete information about Dynamatic problem-solving equipment, check with your local Eaton-Dynamatic representative or distributor.

The New Quill-Type Ajusto-Spede Drive provides controlled adjustable speeds for applications from 1/2 HP through 71/2 HP. Together with the new K-2 Electronic Control and push-button station, this new Ajusto-Spede Drive comprises a compact, low-cost, 3-unit drive package.

Send for Illustrated Descriptive Literature Covering New Models ACM-903 and 904 Ajusto-Spede Drives





When You See the Name Ajusto-Spede You Know it's an Eaton Product

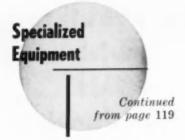
DYNAMATIC DIVISION FACTURING COMPANY

3307 FOURTEENTH AVENUE

PIONEER IN EDDY-CURRENT EQUIPMENT

AUTOMOTIVE INDUSTRIES, September 1, 1959

Circle 178 on Inquiry Card for more data



THE SHEFFIELD CORP.

DRILL DETECTOR UNIT—A pneumatic drill detector unit for use with

multiple or single station automatic drilling machines that "spots" broken and missing drills and supplies a signal for machine shutdown is available.

The device is unaffected by dirt or coolant. It detects the presence or absence of a drill or similar tool by means of a stream of air playing against each drill as the drill enters or is retracted from the workpiece. A broken or missing drill causes a pressure drop in the circuit which, in turn, initiates an electrical impulse to operate signal lights and relays.

Circle 389 on postcard for more data

HELI-COIL CORP.

INSERTING UNIT—A high-speed machine has been designed to automatically install wire thread inserts and break off the driving tang in a complex one-piece aluminum automatic transmission case and converter housing. The machine is equipped with two separate stations: one loads, aligns and simultaneously drives three Heli-Coil inserts while the second breaks and catches the driving tang.

Circle 390 on postcard for more data

LANDIS MACHINE CO.

THREAD ROLLING HEAD—A revolving type thread rolling head has been developed for application to Landis automatic forming and threading machines and 4-spindle semi-automatic threading machines. Named the No. 7 TRP, it has a 7/16 to 3/8 in. U.N.F. and U.N.C. range.

Of "pull-off" design, the device is automatically opened by the forward travel of the machine's threading spindle. For closing, a cam shoe actuates the head's operating ring as the machine's spindle is withdrawn after rolling.

Circle 391 on postcard for more data

GARDNER-DENVER CO.

CLOSE QUARTER AIR TOOLS—A series of air tools is designed for drilling or assembly operations in close quarters. The angle drills, nut



Gardner close quarter air tools

setters and screw drivers are tailored for minimum clearance applications in the assembly of many products, including industrial machinery.

They range in weight from 2½ to 3% lb, and feature sturdy construction with ball bearings. Bevel gears and spline drives are used.

Each tool is available in five sizes with speeds ranging from 3200 rpm for smallest sizes to 450 rpm for the largest size. Basic motors used in the three tools are identical.

Circle 216 on postcard for more data (Turn to page 158, please)

at last!

a low cost, small size large area filter

Solve your installation problem with just one ROOSA MASTER fuel filter assembly with paper element filter. Only 6" high, 3½" in diameter, it takes less space on your engine. No tools required, no fuel lines to disconnect and only 1" clearance needed when changing element . . . and it costs less than throw-away filter assemblies. Write for information.



makes good diesels better

HARTFORD MACHINE SCREW CO., HARTFORD 2, CONN.
DIVISION OF STANDARD SCREW COMPANY

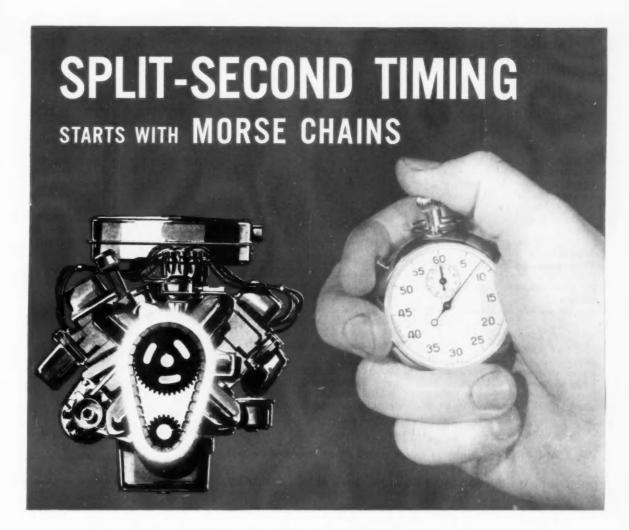




YOU CAN DEPEND ON THE DIESEL THAT DEPENDS ON ROOSA MASTER

tion prov

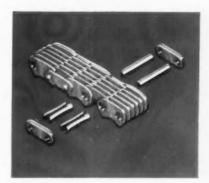
filtering s



The No. 1 choice of automotive engineers!

More than likely the engine in your car is timed by Morse Silent Chain. Morse is "up front" in most Americanmade cars. Morse split-second accuracy... like the timing of a fine watch, and, almost as silent... meets the demand of today's high horse-power engines. This accuracy spells dependable performance.

For over 55 years, Morse precision has insured perfect valve timing with unexcelled power and smoothness for the life of the engine. Basic design and rigid quality-control are extra reasons for thousands of trouble-free miles. For original equipment or replacement, do as engineers do—contact Morse first. Call, write or wire today: MORSE CHAIN COMPANY, Detroit, Michigan; Ithaca, New York. Export Sales: Borg-Warner International, Chicago 3, Ill. In Canada: Morse Chain of Canada, Ltd., Simcoe, Ontario.



MORSE



A BORG-WARNER INDUSTRY Spring-bushing joint construction of Morse Timing Chain serves as a friction damping device to minimize noise and wear. This new bushing also cuts joint vibration and reduces the tendency to "whip"; provides for take-up of slack, Ask for Catalog C60-51.

ONLY MORSE OFFERS ALL 4: Roller Chain, Silent Chain, Hy-Vo® Drives and "Timing" Belts

Specialized Equipment

Continued from page 156

THE YOUNG RADIATOR CO.

MOBILE COOLING UNITS—A line of mobile cooling units has been designed to control temperature and to circulate hydraulic oils or electronic cooling fluids such as fluorochemicals. Units are available with either water or air-cooled heat exchangers.

Completely equipped, they can be furnished with pumps having special Teflon seals for low viscosity fluids. Casters are equipped with locks and the units will pass through standard size doors.

Circle 217 on postcard for more data

ACROMARK CO

ROTARY MARKING MACHINE—A rotary marking machine with a 14 in. stroke, air operated from standard 75 psi or greater plant air, for marking parts, products and materials, at a speed of 1500 or more marked parts

per hour has been designed.

Designated as the Acromark Model No. 9A-14, the machine utilizes flat dies engraved with raised lettering or design to mark rings, hand-wheels, dials, rods and other cylindrical products. In operation the products to be marked are placed on a rotating mandrel or fixture and it rotates as the



Acromark Model 9A-14 marking machine

die passes over it impressing the mark by the "point of contact" method which actually rotates the part against the die.

Circle 218 on postcard for more data

WESTINGHOUSE ELECTRIC CORP.

POWER CENTERS—Dry-type power centers, featuring low sound levels and type RM lightning arresters, have been designed. Sound levels of the units range from four to nearly ten decibels below NEMA standards, with the greatest reduction in the larger

These power centers are primarily used to reduce voltage in industrial plants for lighting and machine tool circuits.

Circle 219 on postcard for more data

CLECO AIR TOOLS

AIR TOOL—Three tools in one—drill, screwdriver, and nut runner—is the result of new lines of pneumatic products.

The tools are incorporated in the No. 10 series pneumatic screwdrivers and No. 10 series drills. Complete interchangeability of parts between



Cleco highly versatile air tool

the series enables each of these basic tools to perform multiple jobs.

Cleco air motors power both series. All gear reductions use three-idler planetary gear trains, bushed for extra-long wear.

Circle 220 on postcard for more data

WATEROUS CO.

POWER TAKE-OFF—A split shaft power take-off capable of transmitting full engine power to operate accessory equipment has been developed.

The full-torque, direct-drive unit features rigid alignment, and gear spacing is maintained by integral machining of single splitter and take-off



Waterous split shaft power take-off

case. Standard models are available with PTO speeds of from 49 to 204 per cent of input.

Circle 221 on postcard for more data

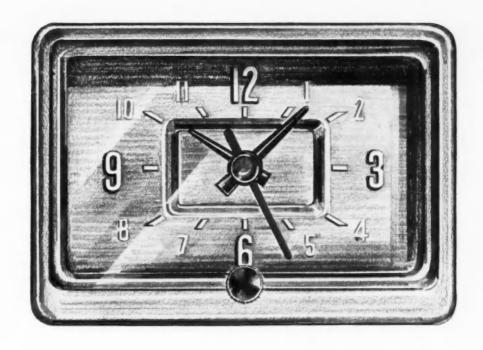
WE CAN PROVE, right in your plant, that these Airetool pneumatic production tools do more work at less cost. And we'll show you how Airetool air motors eliminate electrical hazard, keep maintenance costs down to rock bottom. Just write General Manager, Airetool Manufacturing Co., Springfield, Ohio, for obligation-free plant demonstration.



Airetool offices and representatives in principal cities of U.S.A., Canada, Mexico, Puerto Rico, South America, Hawaii, England, Italy, Europe, Japan

CANADIAN PLANT: 37 Spalding Drive Brantford, Ontario EUROPEAN PLANT: Visardingen The Netherlands





KING-SEELEY Acquires "MOTOCHRON"

"Motochron" the precision clock for automobile instrument panels, developed by G. E., is now being produced and marketed by King-Seeley.

Our organization is ideally qualified in both experience and facilities for this undertaking. For nearly 20 years we have produced precision timers for the leading manufacturers of home appliances.

Our instrumentation and instrument panels have been used by the automotive industry for more than 30 years.

The K-S "Motochron" Clock augments our complete line of automotive instruments, speed-ometers and warning devices.

KING-SEELEY
CORPORATION
ANN ARBOR, MICHIGAN

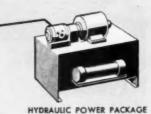


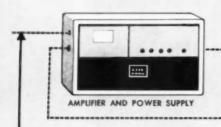
8382

A NEW CONCEPT

"BUILDING BLOCK"

Electro-Hydraulic Servo Systems











PRE-ENGINEERED TO SAVE YOU MONEY

Standard hydraulic and electrical components are now preengineered into a series of complete and dependable Electro-Hydraulic Servo Systems. Vickers has the most extensive line of individual "building block" components available for such systems. Inherent "trim flexibility" makes possible systems which will satisfy a very wide range of application... at only a <u>fraction of the cost</u> usually incurred in specially engineered systems. A very substantial saving in lead time is now possible.

Vickers "Building Block" Closed Loop Servo Systems have proved their merit on machine tools, fabricating machines and processing equipment. The amplifier is precisely matched to the servo valve torque motor. The work load requirement is continuously monitored by electrical feedback devices to insure that directions (command signals) are accurately followed at all times.

SERVO CYLINDER (OPTIONAL)

Positional accuracy of better than .001 is obtainable with a hydraulic motor and lead screw. In many position applications, cylinders can be used with similar accuracies. Velocity can be maintained within one or two rpm. In addition to position and velocity controls now in service, constant horse-power and constant tension systems soon will be available. Any command signal may be used with these systems . . . from a simple potentiometer to complete numerical control. For further information, ask for Engneering Bulletin No. 59-75.

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"WEIRKOTE'S SOMETHING SPECIAL! IT CAN END THE NEED FOR ANY FURTHER CORROSION PROTECTION AFTER FABRICATION."

- Q. You mean it? Weirkote can save you the cost of any further processing for corrosion protection after fabrication?
- A. Absolutely. It's the continuous process that does it. Integrates the zinc to the steel so tightly there's never any peeling or flaking. No matter how severe the fabrication—any torture test you put it through—that bond stays put!
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WEIRTON STEEL COMPANY

WEIRTON, WEST VIRGINIA



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Three-piece rim construction with tubular side ring and lock ring for positive "blow-off" protection along with the fine surface finish and dimensional exactness of its rugged cold-rolled disc makes Kelsey-Hayes advanced wide-base wheel construction the choice of fleet operators the world over. Kelsey-Hayes Company, Detroit 32, Michigan.

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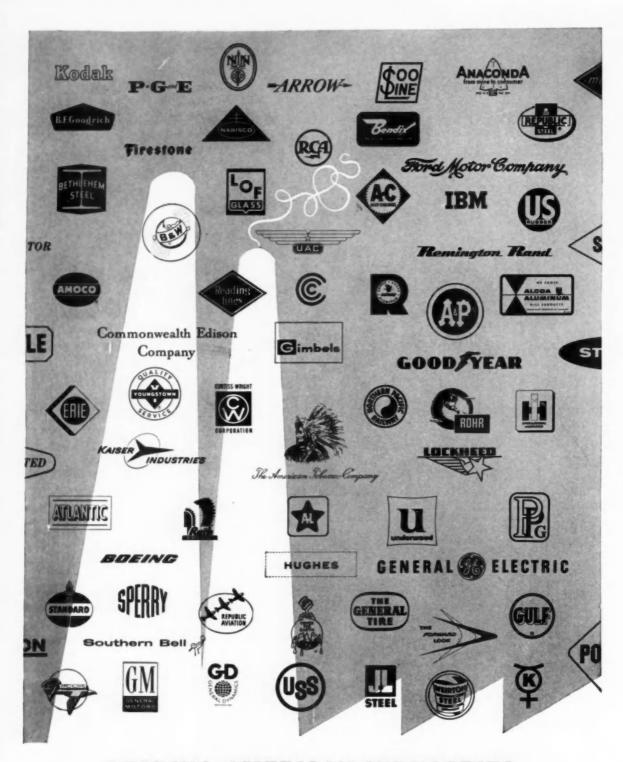
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18 PLANTS: Detroit and Jackson, Michigan; Los Angeles; Philadelphia and McKeesport, Pennsylvania; Springfield, Ohio; New Hartford and Utica, New York; Davesport, Iowa; Windsor, Ontario, Canada.



Automotive Industries, September 1, 1959

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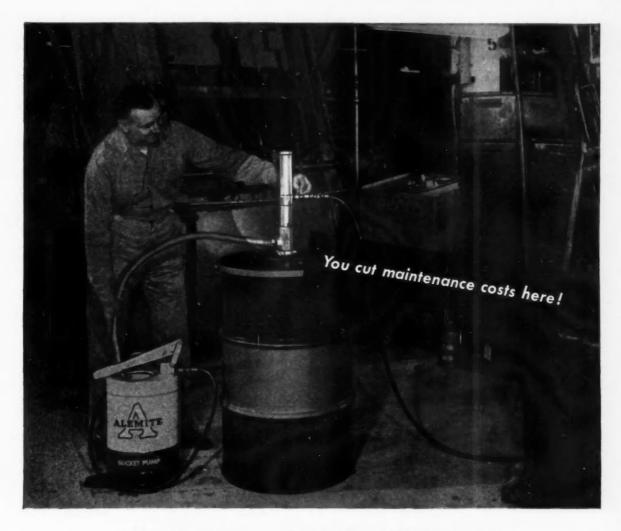


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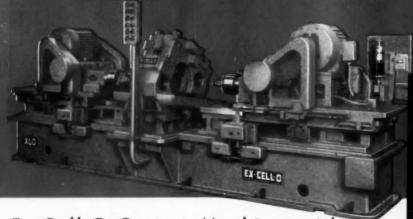
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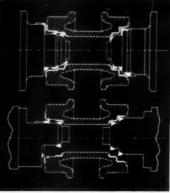


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This Ex-Cell-O Custom Machine features precision—in a big way.

A track roller for rugged, off-the-road equipment, is clamped in the hydraulically-actuated fixture; the rest—from rough to finish—is automatic.

The part is first rough-bored on both ends at the same time. Then both slides retract and the fixture indexes into position for finish boring and facing at both ends, simultaneously. (Drawing, above-right, shows rough and finish tooling.) Slides again retract and the fixture is unclamped, ready for the next cycle. Easily changed tooling heads and clamping jaws permit precision machining of any of three similar components with minimum lag in production.



59-23

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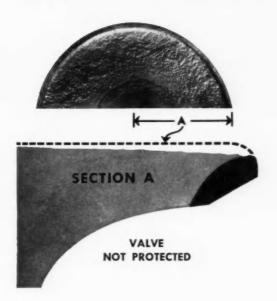
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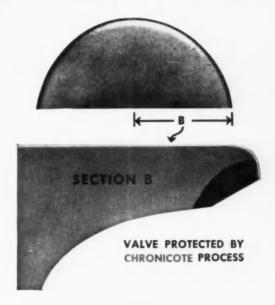
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FREE LITERATURE

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The CDF line of Micabond bonded mica insulation is described in a 16 page catalog prepared by Continental-Diamond Fibre Corp. The catalog lists complete information about grades, sizes, weights and specifications for this insulating material.

Fastening Facilities

Fastening facilities for producing all types of fastenings, including standard, Flo-Form parts, titanium and high-temperature aircraft, and extruded shapes, are described in a 23 page trochure published by The H. M. Harper Co.

Ways and Gibs

A new product catalog details O.K. standard way and aluminum-bronze way cross-section products plus a complete line of hardened ways and gibs, bronze ways and wear strips, and many other products for the machine tool industry. The Ohio Knife Co.

Production Lathes

A 26 page booklet covering Gisholt Masterline No. 12, No. 12V, and No. 24 automatic production lathes is available from the Gisholt Machine Co. Each unit is completely illustrated showing machine features and accessories as well as floor plans and specifications.

Gage Control

Bulletin GEA-6947 describes a new gagemeter control system which automatically controls mill stands to roll continuously uniform strip. The system is designed to give greater yield per ton of steel from hot-strip mills. General Electric Co.

Blind Rivet

Revised 16 page Form 8-388 describes the Conical Keystone Lock (CKL) blind rivet for high-strength structural fastening. Drawings are used to explain the driving cycle of the lock-spindle blind fastener. Huck Mfg. Co.

Set Screw Chart

The Set Screw Mfg. Co. has prepared an easy-to-read selector chart to aid designers and engineers in selecting the proper self-locking set screw for many screw applications.

(Continued on next page)

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Resistance Welding

A 16 page bulletin offers a variety of resistance welding case histories. Both high standard aviation and commercial welding are included. Scial is

Boring Bars

Bros., Inc.

A system of listing and pricing individual elements of boring bars enables users of the Davis Catalog No. D-520 to secure custom-arranged bars at standard prices. The catalog describes both general-purpose and production bars for either line or stub boring operations. Giddings & Lewis Machine Tool Co., Davis Div.

Generator Bulletin

Characteristics of high-speed, packaged brushless synchronous generators in 40 to 300 kw ratings which provide dependability, minimum maintenance, constant voltage, and no sparking are described in a new bulletin prepared by the Atlis-Chalmers Mfg. Co.

Parts Counter

A product information bulletin describes the Model 605 automatic parts counter. The fully transistorized electronic unit counts odd shaped objects automatically at high speed. Atronic

Dust Collector

New data and information on dust collector accessories has been issued by the Torit Mfg. Co. Illustrations, drawings, and specifications are in-

Wheel Feed

Bulletin MF-59, four pages, describes the Landis wheel feed, called Microfeed. The wheel feed is an ultra-fine feed to final size that cancels grinding feed variables that are common to all cylindrical grinder feed systems. Landis Tool Co.

Extruded Metal Parts

A four page bulletin treating the process of producing cold extruded metal parts, their physical characteristics, mechanical properties, and applications, is offered by the Burgess-Norton Mfg. Co.

Facilities

United States Testing Co. announces the availability of six page Bulletin 5902, describing the company's Materials Evaluation Division's facilities and services for analysis, development, research, and inspection of materials and products.

Horn Presses

Bulletin 52170A, 12 pages, illustrates and describer the WARCO line of horn presses in capacities from 50 to 200 tons, inclusive. The Federal Machine and Welder Co.

Steel Brochure

Universal-Cyclops Steel Corp. announces publication of a technical data brochure covering Unimach 1 and Unimach 11 high strength, high temperature steels, for critical structural applications in airborne vehicles.

Tractor Shovel

A specification bulletin covering the features of the Model 204 Trojan tractor shovel is available from the Yale & Towne Mfg. Co.

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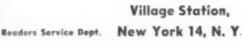
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FREE LITERATURE continued

Casting Aluminum 19

Casting aluminum is the subject of a new technical handbook available from the Reynolds Metals Co. Tubular matter is presented in eight easy-reference tables on a wide range of subjects, including core sand mixes, tolerances, and weight comparisons.

Tube & Bar Stock 20

Shenango Bulletin 156 offers detailed information on standard bar and tube stock available in three special materials—GC mechanite metal, GA mechanite metal and Type L Ni-Resistant. Physical properties are included in chart form. Centrifugally Cast Products Div., The Shenango Furnace Co.

Tubular Products 2

A data card describes the properties of B & W Croloy 25-20—its chemical composition, size ranges, and short time high temperature tensile and rupture properties. The Babcock & Wilcox Co.

Finishing Media 22

Barrel finishing media costs can be reduced by use of the new, portable automatic Media Classifier described in a two page catalog sheet. Almoo-Queen Products Div., King-Seeley Corp.

Vinyl Coated Steel 23

A four page brochure describes several vinyl coated steel applications and tells of the many advantages of vinyl coated sheet steel as applied to all types of products. *United States Steel Corp.*

Air Valves 24

Bulletin 235 covers alternate bases and the integral speed control section for Hannifin Series "CC" 4-way directional control air valves. Hannifin Co.

(Continued on next page)

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25

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26

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27

Bulletin 112 covers both air and hydraulic applications for a line of adjustable stroke cylinders. It contains dimensional data and engineering drawings of available mounts and accessories, as well as detailed specifications. Ortman-Miller Machine Co.

Power Control Rooms 28

Bulletin GEA-6948 discusses the features of General Electric's new "packaged" power and control rooms. Complete process line controls and power components are grouped compactly in these self-contained units. General Electric Co.

Hydraulic Valve Manual

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